

10634725
12-19-03



Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number:

**0 282 944
A2**

(12)

EUROPEAN PATENT APPLICATION

(21) Application number: 88103999.4

(22) Date of filing: 14.03.88

(51) Int. Cl.⁴: **C07D 231/20** , C07D 231/30 ,
C07D 231/32 , C07D 405/12 ,
C07D 409/12 , C07F 9/65 ,
C07F 7/08 , C07F 7/18 ,
A01N 43/56 , A01N 57/16 ,
A01N 55/00 , //C07C149/40,
C07C147/107, C07C63/68,
C07C149/247

(30) Priority: 17.03.87 JP 61937/87
17.07.87 JP 179797/87
30.09.87 JP 247601/87
13.01.88 JP 5449/88

(43) Date of publication of application:
21.09.88 Bulletin 88/38

(54) Designated Contracting States:
AT BE CH DE ES FR GB GR IT LI LU NL SE

(71) Applicant: **NISSAN CHEMICAL INDUSTRIES LTD.**
7-1, 3-chome Kanda-Nishiki-cho
Chiyoda-ku Tokyo(JP)

(72) Inventor: **Baba, Masatoshi**
Copo Yamaichi 203, Hon-machi
Wako-shi Saitama-ken(JP)
Inventor: **Kakuta, Takuya**
5-17-304, Narashino 1-chome
Funabashi-shi Chiba-ken(JP)
Inventor: **Tanaka, Norio**
788-74, Kowagama
Funabashi-shi Chiba-ken(JP)
Inventor: **Oya, Eiichi**
Nissan Kagaku Kogyo Yatsu-ryo 5-32-9,
Yatsu
Narashino-shi Chiba-ken(JP)
Inventor: **Ikai, Takashi**
19-7, Nishishinjuku 7-chome
Shinjuku-ku Tokyo(JP)
Inventor: **Nawamaki, Tsutomu**
7-3-102, Oto 6-chome
Yono-shi Saitama-ken(JP)
Inventor: **Watanabe, Shigeomi**
14-46-103, Higashiomiya 3-chome
Omiya-shi Saitama-ken(JP)

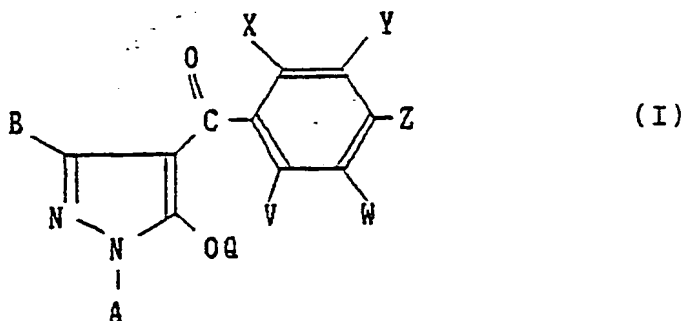
(74) Representative: **Wächtershäuser, Günter, Dr.**
Tal 29
D-8000 München 2(DE)

EP 0 282 944 A2

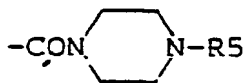
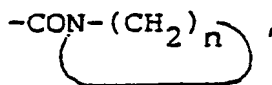
(54) **Pyrazole derivative and herbicid containing it.**

(57)

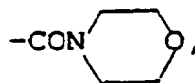
1. A pyrazole derivative having the formula:



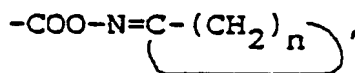
wherein A is alkyl, alkenyl or alkynyl; B is hydrogen, alkyl, halogen, haloalkyl, alkoxy, alkylthio, alkoxyalkyl, alkylthioalkyl or alkoxycarbonyl; X is alkyl, alkoxy, halogen, nitro, cyano, haloalkyl, alkoxyalkyl, alkylcarbonyl, alkoxycarbonyl, aminocarbonyl substituted by hydrogen or alkyl, haloalkoxy, alkylthio or alkylthioalkyl; Y is -COOR₁ (wherein R₁ is hydrogen, alkyl, etc.), -COO-L-OR₁ (wherein L is alkylene which may be substituted), -COO-L-R₂ (wherein R₂ is phenyl group which may be substituted), -COO-M (wherein M is 3 to 6-membered alicyclic residue containing not more than 2 sulfur or oxygen atoms), -COO-L-M, -COO-L-O-L-R₂, -COO-L-S(O)_n-R₁, -CON(R₃)(R₄) (wherein each of R₃ and R₄ is hydrogen, alkyl etc.), a



(wherein R₅ is alkyl),

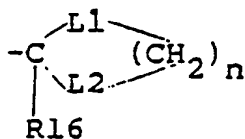


-CONHSO₂CH₃, -CONHSO₂CF₃, -COO-L-N(R₃)(R₄), -COO-L-CO-R₁, -COO-L-CO-O-R₁, -COO-L-CN, -COO-L-NO₂, -COOSi(R₅)₃, -COO-N=C(R₆)(R₇) (wherein each of R₆ and R₇ is alkyl),



-COO-L-O-SO₂-R₁, -COO-L-O-CO-R₁, -COO-L-O-L-O-R₁, -COO-L-Si(R₅)₃, -C(O)S-R₁, -C(S)O-R₁, -C(S)S-R₁, -L-O-R₁, -L-O-L-O-R₈ (wherein R₈ is hydrogen or alkyl), -L-O-M, -L-O-L-M, -L-NR₈R₉ (wherein R₉ is alkyl group), -L-O-CH₂Ph, -L-O-L-COOR₉, -L-CN, -L-S(O)_n-R₁, -L-S-L-O-R₉, -L-O-COR₉, -L-O-SO₂R₉, -L-COOR₈, -C=CHOR₈ or -L-O-L-CN; Z is halogen, nitro, alkoxy, trifluoromethyl, cyano or -S(O)_nR₁₀ (wherein R₁₀ is alkyl or haloalkyl); V is a hydrogen atom, a halogen atom, an alkyl group having from 1 to 4 carbon atoms or an alkoxy group having from 1 to 4 carbon atoms; W is a hydrogen atom, a halogen atom, an alkyl group having from 1 to 4 carbon atoms, a haloalkyl group having from 1 to 4 carbon atoms, an alkoxy group having from 1 to 4 carbon atoms, an alkoxyalkyl group having from 2 to 6 carbon atoms, an alkoxycarbonyl group having from 2 to 5 carbon atoms, a haloalkoxy group having from 1 to 3 carbon atoms, a nitro group, a cyano group or a -S(O)_n-R group (wherein n is as defined above and R is an alkyl group having from 1 to 4 carbon atoms); Q is hydrogen, alkyl, alkenyl, alkynyl, cyanomethyl, -C(O)-R₁₁ (wherein R₁₁ is phenyl group which may be substituted, alkyl, alkoxy or hydroxyl), -S(O)₂R₁₁, -P(O)(OR₁₁)₂, -L-C(O)-R₁₁, -L-C(O)-

N(R₁₂)(R₁₃) (wherein each of R₁₂ and R₁₃ is hydrogen or alkyl), -L-R₁₄ (wherein R₁₄ is phenyl which may be substituted, alkyl, alkoxy or hydroxy), -L-N(R₁₂)(R₁₃), a -L-OR₁₅ (wherein R₁₅ is hydrogen, alkyl or alkenyl), -L-OC(O)R₁₆ (wherein R₁₆ is alkyl or alkoxy), -L-S(O)_nR₁₅, -L-SC(O)R₁₂,



(wherein each of L₁ and L₂ is methylene, oxygen or sulfur and R₁₆ is hydrogen or alkyl), and a salt thereof, useful as a herbicide.

PYRAZOLE DERIVATIVE AND HERBICIDE CONTAINING IT

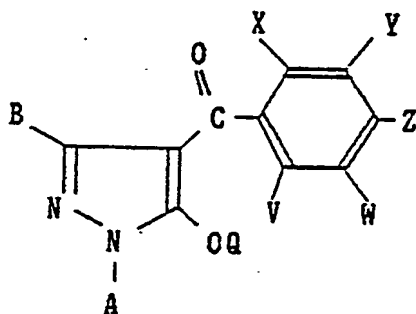
The present invention relates to novel 4-benzoylpyrazole derivatives and selective herbicides containing such derivatives as active ingredients, which are useful particularly as upland field herbicides.

Various herbicides have been developed for practical use from extensive research and development of herbicides for many years, and such herbicides have contributed to a reduction of the labor force required for controlling weeds or to improvement of the productivity of agricultural or horticultural plants.

Even now, it is still desired to develop a new herbicide having superior herbicidal properties. In particular, it is desired to develop an agricultural or horticultural herbicide which is capable of selectively controlling weeds without adversely affecting the crop plant and at a low dose. However, conventional herbicides do not necessarily provide such desired herbicidal properties.

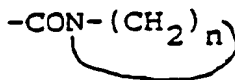
On the other hand, certain compounds of 4-benzoylpyrazole derivatives are known to have herbicidal activities. For example, pyrazolate (common name) and pyrazoxyfen (common name) are practically used as herbicides for paddy fields. While exhibiting excellent herbicidal activities as paddy field herbicides, these compounds are not suitable as upland herbicides since their herbicidal activities are weak against weeds of upland fields. Among 4-benzoylpyrazole derivatives, it is desired to develop a superior compound useful as an upland field herbicide.

The present invention provides a pyrazole derivative having the formula:

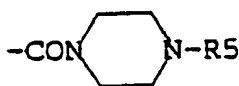


wherein A is an alkyl group having from 1 to 3 carbon atoms, an alkenyl group having from 2 to 4 carbon atoms or an alkynyl group having from 2 to 4 carbon atoms; B is a hydrogen atom, an alkyl group having from 1 to 3 carbon atoms, a halogen atom, a haloalkyl group having from 1 to 3 carbon atoms, an alkoxy group having from 1 to 3 carbon atoms, an alkylthio group having from 1 to 3 carbon atoms, an alkoxyalkyl group having from 2 to 4 carbon atoms, an alkylthioalkyl group having from 2 to 4 carbon atoms or an alkoxyalkyl group having from 2 to 4 carbon atoms; X is an alkyl group having from 1 to 6 carbon atoms, an alkoxy group having from 1 to 6 carbon atoms, a halogen atom, a nitro group, a cyano group, a haloalkyl group having from 1 to 6 carbon atoms, an alkoxyalkyl group having from 2 to 6 carbon atoms, an alkylcarbonyl group having from 2 to 6 carbon atoms, an alkoxyalkyl group having from 2 to 6 carbon atoms, an aminocarbonyl group substituted independently by hydrogen or alkyl having from 1 to 6 carbon atoms, a haloalkoxy group having from 1 to 6 carbon atoms, an alkylthio group having from 1 to 6 carbon atoms or an alkylthioalkyl group having from 2 to 6 carbon atoms; Y is a -COOR₁ group (wherein R₁ is a hydrogen atom, an alkyl group having from 1 to 6 carbon atoms, a cycloalkyl group having from 3 to 8 carbon atoms, a cycloalkylalkyl group having from 4 to 8 carbon atoms, an alkynyl group having from 3 to 6 carbon atoms, an alkenyl group having from 2 to 6 carbon atoms, a haloalkyl group having from 1 to 6 carbon atoms, a halocycloalkyl group having from 3 to 8 carbon atoms, a haloalkynyl group having from 3 to 6 carbon atoms, a haloalkenyl group having from 2 to 6 carbon atoms or a phenyl group which may be substituted by alkyl having from 1 to 3 carbon atoms, halogen, nitro or alkoxy having from 1 to 3 carbon atoms), a -COO-L-OR₁ group (wherein L is an alkylene group having from 1 to 6 carbon atoms which may be substituted by alkyl having from 1 to 3 carbon atoms, and R₁ is as defined above), a -COO-L-R₂ group (wherein L is as defined above, and R₂ is a phenyl group which may be substituted by alkyl having from 1 to 3 carbon atoms, halogen, nitro or alkoxy having from 1 to 3 carbon atoms), a -COO-M group (wherein M is a 3 to 6-membered alicyclic residue containing not more than 2 sulfur or oxygen atoms and formed by a linkage of from 1 to 4 carbon atoms), a -COO-L-M group (wherein L and M are as defined above), a -COO-L-O-L-R₂ group (wherein L and R₂ are as defined above), a -COO-L-S(O)_n-R₁ group (wherein L and R₁ are as

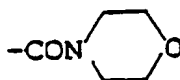
defined above, and n is an integer of from 0 to 2), a -CON(R3)(R4) group (wherein each of R3 and R4 is a hydrogen atom, an alkyl group having from 1 to 6 carbon atoms, a cycloalkyl group having from 3 to 8 carbon atoms, a cycloalkylalkyl group having from 4 to 8 carbon atoms, an alkoxy group having from 1 to 6 carbon atoms, an alkynyl group having from 2 to 6 carbon atoms, an alkenyl group having from 2 to 6 carbon atoms, a haloalkyl group having from 1 to 6 carbon atoms, a halocycloalkyl group having from 3 to 8 carbon atoms, a haloalkynyl group having from 2 to 6 carbon atoms, a haloalkenyl group having from 2 to 6 carbon atoms or a phenyl group which may be substituted by alkyl having from 1 to 3 carbon atoms, halogen, nitro or alkoxy having from 1 to 3 carbon atoms), a



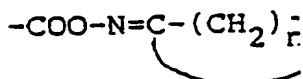
group (wherein n is an integer of from 4 to 6), a



group (wherein R5 is an alkyl group having from 1 to 3 carbon atoms), a



group, a -CONHSO₂CH₃ group, a -CONHSO₂CF₃ group, a -COO-L-N(R3)(R4) group (wherein L, R3 and R4 are as defined above), a -COO-L-CO-R1 group (wherein L and R1 are as defined above), a -COO-L-CO-O-R1 group (wherein L and R1 are as defined above), a -COO-L-CN group (wherein L is as defined above), a -COO-L-NO₂ group (wherein L is as defined above), a -COOSi(R5)₃ group (wherein R5 is as defined above), a -COO-N=C(R6)(R7) group (wherein each of R6 and R7 which may be the same or different is an alkyl group having from 1 to 3 carbon atoms), a



group (wherein n is an integer of from 4 to 6), a -COO-L-O-SO₂-R1 group (wherein L and R1 are as defined above), a -COO-L-O-CO-R1 group (wherein L and R1 are as defined above), a -COO-L-O-L-O-R1 group (wherein L and R1 are as defined above), a -COO-L-Si(R5)₃ group (wherein L and R5 are as defined above), a -C(O)S-R1 group (wherein R1 is as defined above), a -C(S)O-R1 group (wherein R1 is as defined above), a -C(S)S-R1 group (wherein R1 is as defined above), a -L-O-R1 group (wherein L and R1 are as defined above), a -L-O-L-O-R8 group (wherein L is as defined above, and R8 is a hydrogen atom or an alkyl group having from 1 to 6 carbon atoms), a -L-O-M group (wherein L and M are as defined above), a -L-O-L-M group (wherein L and M are as defined above), a -L-NR8R9 group (wherein R8 is as defined above, and R9 is an alkyl group having from 1 to 6 carbon atoms), a -L-O-CH₂Ph group (wherein L is as defined above), a -L-O-L-COOR9 group (wherein L and R9 are as defined above), a -L-CN group (wherein L is as defined above), a -L-S(O)_n-R1 group (wherein L and R1 are as defined above, and n is an integer of from 0 to 2), a -L-S-L-O-R9 group (wherein L and R9 are as defined above), a -L-O-COR9 group (wherein L and R9 are as defined above), a -L-COOR8 group (wherein L and R8 are as defined above), a -CH=CHOR8 group (wherein R8 is as defined above) or a -L-O-L-CN group (wherein L is as defined above); Z is a halogen atom, a nitro group, an alkoxy group having from 1 to 3 carbon atoms, a trifluoromethyl group, a cyano group or a -S(O)_nR10 group (wherein R10 is an alkyl group having from 1 to 3 carbon atoms or a haloalkyl group having from 1 to 3 carbon atoms, and n is an integer of from 0 to 2); V is a hydrogen atom, a halogen atom, an alkyl group having from 1 to 4 carbon atoms or an alkoxy group having from 1 to 4 carbon atoms; W is a hydrogen atom, a halogen atom, an alkyl group having from 1 to 4 carbon atoms, a haloalkyl group having from 1 to 4 carbon atoms, an alkoxy group

25



35

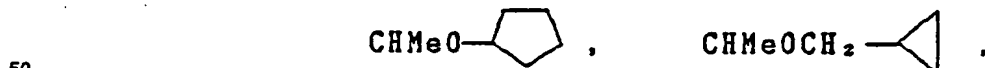
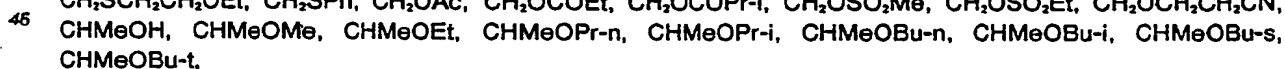
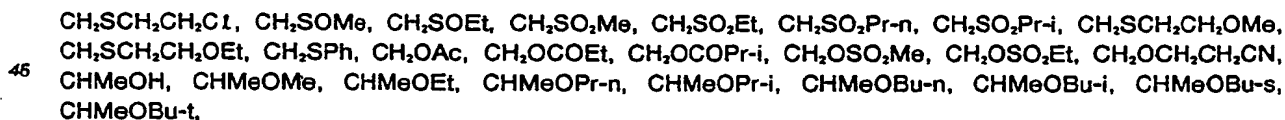
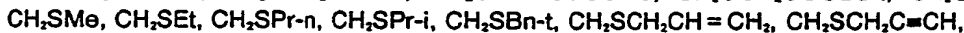
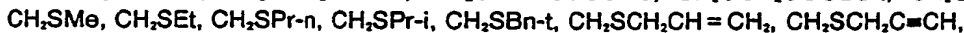
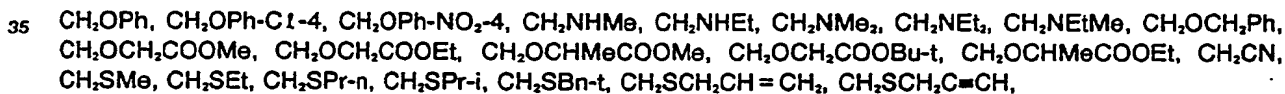
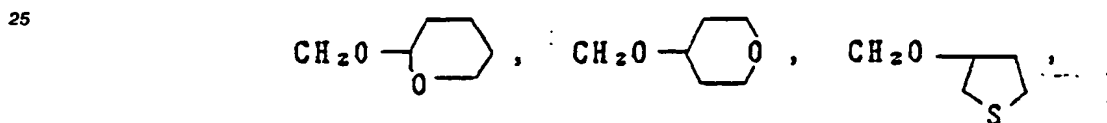
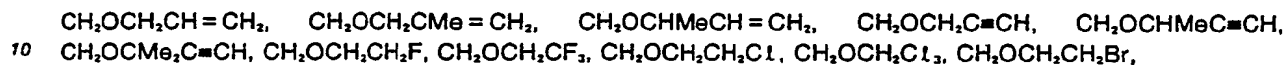
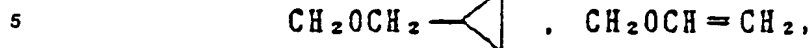
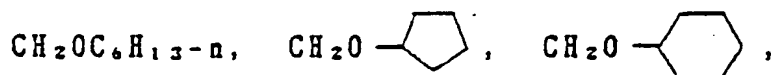
40

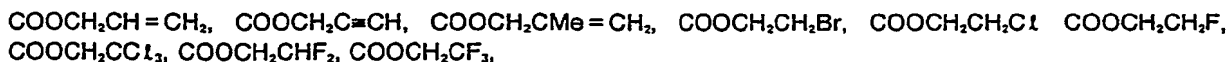
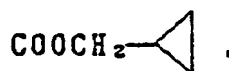
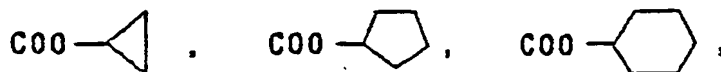
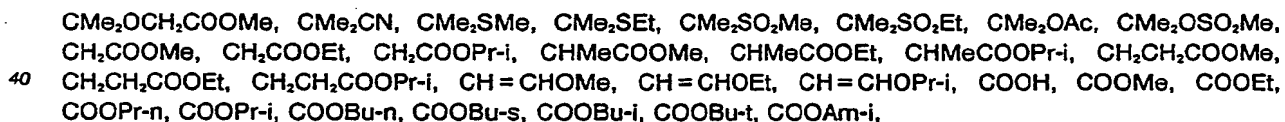
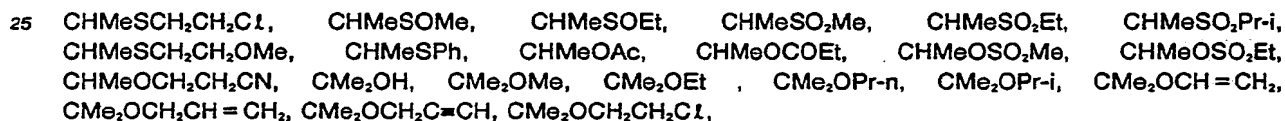
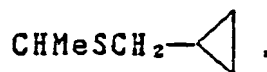
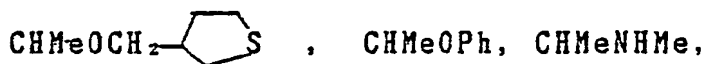
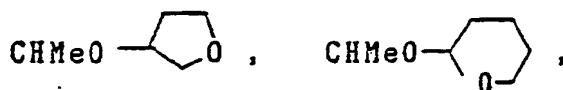
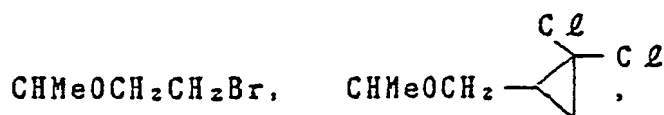
45

45

50

6



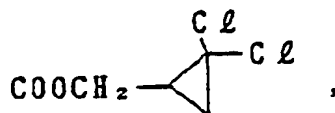




5

COOCH₂CCl=CH₂, COOCH₂CCl=CHCℓ, COOCH₂OMe, COOCH₂CH₂OMe, COOCH₂CH₂OEt, COOCH₂OEt,
 COOCH₂SMe, COOCH₂CH₂SMe, COOCH₂CH₂SEt, COOCH₂CH₂SCH₂CH₂Cℓ, COOCH₂SOMe,
 COOCH₂CH₂SOMe, COOCH₂CH₂OCH₂CH₂Cℓ, COOCH₂CH₂OCH₂CH₂Br, COOCH₂CH₂OSO₂Me,
 10 COOCH₂CH₂OSO₂Ph-Me-4, COOCH₂OCH₂CH₂OMe, COOCH₂CH₂SO₂Me, COOCH₂CH₂SO₂Et,
 COOCH₂SO₂Me, COOCH₂CN, COOCH₂CH₂CN, COOCH₂CH₂CH₂CN, COOCH₂CH₂NHMe, COOCH₂CH₂NMe₂,
 COOCH₂NMe₂, COOCH₂CH₂NO₂, COOCH₂CH₂CH₂NO₂, COOCH₂OH,

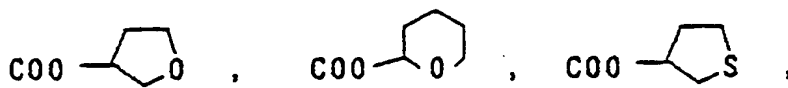
15



20

COOCH₂COMe, COOCH₂COBu-t, COOCH₂COPr-i, COOCH₂COPh, COOCH₂COOMe, COOCH₂COOEt,
 COOCHMeCOOMe, COOCMe₂OOMe, COOCH₂CH₂OCH₂CH=CH₂, COOCH₂CH₂OCH₂C≡CH,
 COOCH₂CH₂OPh, COOCH₂OPh, COOCH₂CH₂OCH₂Ph, COOCH₂SiMe₃, COOSiMe₃, COOSiEt, COOPh,
 COOPh-Cℓ-4, COOPh-Me-4, COOPh-OMe-4, COOPh-NO₂-4, COOCH₂Ph, COOCH₂Ph-Cℓ-2, COOCH₂Ph-
 Cℓ-4, COOCHMePh, COOCH₂CH₂Ph,

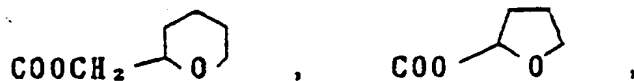
25



30



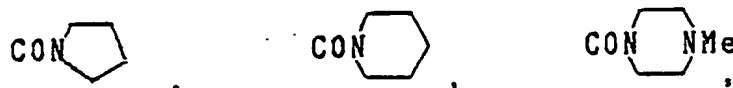
35



40

C(O)SMe, C(O)SEt, C(O)SPr-i, C(O)SPr-n, C(O)SBu-n, C(O)SBu-t, C(O)SBu-s, C(O)SBu-i, C(S)OMe, C(S)-
 OEt, C(S)OPr-i, C(S)OPr-n, C(S)OBu-n, C(S)OBu-t, C(S)OBu-s, C(S)OBu-i, CSSMe, CSSEt, CSSPr-n,
 CSSPr-i, CONMe₂, CONHMe, CONEt₂, CONHEt, CONHPr-n, CONHPr-i, CONHBu-t, CONHBu-s, CONHBu-i,
 CONHBu-n, CONHAm-t, CONPr₂-i, CONPr₂-n, CONHPh, CONHPh-Me-4, CONHPh-NO₂-4,

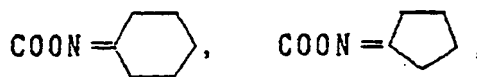
45



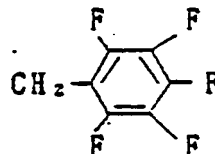
50



55 CONMeOMe, CONHCH₂CH=CH₂, CON(CH₂CH=CH₂)₂, CONHCH₂C≡CH, CON(CH₂C≡CH)₂, CONMePh,
 CONEtPh, CON(Me)Ph-Me-4, CONHSO₂Me, CONHSO₂CF₃, COON=CMe₂,



- 5 $\text{COOCH}_2\text{OCOMe}$, $\text{COOCH}_2\text{OCOBu-t}$,
 $\text{Z} : \text{F}, \text{Cl}, \text{Br}, \text{I}, \text{NO}_2, \text{OMe}, \text{OEt}, \text{OPr-n}, \text{OPr-i}, \text{CF}_3, \text{CN}, \text{SMe}, \text{SOMe}, \text{SO}_2\text{Me}, \text{SCF}_3, \text{SOCF}_3, \text{SO}_2\text{CF}_3$
 $\text{Q} : \text{H}, \text{Me}, \text{Et}, \text{n-Pr}, \text{i-Pr}, \text{n-Bu}, \text{i-Bu}, \text{s-Bu}, \text{t-Bu}, \text{CH}_2\text{CH}_2\text{Cl}, \text{CH}_2\text{CF}_3, \text{CHClMe}, \text{CH}_2\text{CH}_2\text{Br}, \text{CHClCH}_2\text{Cl},$
 $\text{CH}_2\text{CH}=\text{CH}_2, \text{CH}_2\text{CMe}=\text{CH}_2, \text{CH}_2\text{CH}=\text{CHMe}, \text{CH}_2\text{C}\equiv\text{CH}, \text{CH}_2\text{CCl}=\text{CH}_2, \text{CH}_2\text{CN}, \text{CH}_2\text{Ph}, \text{CH}_2\text{Ph-Cl-2}, \text{CH}_2$
10 $\text{Ph-Cl-3}, \text{CH}_2\text{Ph-Me-2},$



15

- $\text{CH}_2\text{Ph-Me-2,4}, \text{CH}_2\text{Ph-Me-4}, \text{CHMePh}, \text{CHEtPh}, \text{CH}_2\text{Ph-NO}_2\text{-2}, \text{CH}_2\text{Ph-CF}_3\text{-3}, \text{CH}_2\text{OMe}, \text{CH}_2\text{OEt}, \text{CH}_2\text{OH},$
20 $\text{CHMeOH}, \text{CH}_2\text{NHMe}, \text{CH}_2\text{NMe}_2, \text{CHMeNMe}_2, \text{CH}_2\text{COPh}, \text{CH}_2\text{COPh-NO}_2\text{-4}, \text{CH}_2\text{COPh-Me-4}, \text{CH}_2\text{COPh-Cl-4},$
 $\text{CH}_2\text{COPh-Me-2,4}, \text{CH}_2\text{COPh-CF}_3\text{-4}, \text{CH}_2\text{Ac}, \text{CH}_2\text{COEt}, \text{CHMeAc}, \text{CH}_2\text{CO}_2\text{Me}, \text{CH}_2\text{CO}_2\text{Et}, \text{CH}_2\text{CO}_2\text{Pr-n},$
 $\text{CH}_2\text{CO}_2\text{Pr-i}, \text{CH}_2\text{CO}_2\text{Bu-t}, \text{CH}_2\text{CO}_2\text{H}, \text{CHMeCO}_2\text{H}, \text{CH}_2\text{CONHMe}, \text{CH}_2\text{CONMe}_2, \text{CH}_2\text{CONHEt}, \text{CH}_2\text{CONEt}_2,$
 $\text{CH}_2\text{CONPr-n}_2, \text{CH}_2\text{OCH}_2\text{CH}=\text{CH}_2, \text{CH}_2\text{OAc}, \text{CH}_2\text{COEt}, \text{CH}_2\text{COPr-i}, \text{CH}_2\text{COBu-t}, \text{CH}_2\text{OCO}_2\text{Me}, \text{CH}_2\text{OCO}_2\text{Et},$
25 $\text{CH}_2\text{OCO}_2\text{Pr-i}, \text{CH}_2\text{OCO}_2\text{Bu-t}, \text{CH}_2\text{SMe}, \text{CH}_2\text{SEt}, \text{CH}_2\text{SCH}_2\text{CH}=\text{CH}_2, \text{CH}_2\text{SAC}, \text{CH}_2\text{SCOBu-t}, \text{CH}_2\text{SO}_2\text{Me},$
 $\text{CH}_2\text{SO}_2\text{Et}, \text{CH}_2\text{SO}_2\text{CH}_2\text{CH}=\text{CH}_2, \text{CH}_2\text{NHCH}_2\text{CH}=\text{CH}_2, \text{CH}_2\text{NMeCH}_2\text{CH}=\text{CH}_2, \text{CH}_2\text{NHAc}, \text{CH}_2\text{NHCOEt},$
 $\text{CH}_2\text{NHCO}_2\text{Me}, \text{CH}_2\text{NHCO}_2\text{Et}, \text{CH}_2\text{NMeCO}_2\text{Me}, \text{COPh}, \text{COPh-Me-4}, \text{COPh-NO}_2\text{-2}, \text{COPh-Cl}_2\text{-2,4}, \text{Ac}, \text{COEt},$
 $\text{COPr-n}, \text{COPr-i}, \text{COBu-n}, \text{COBu-t}, \text{COCH}_2\text{Cl}, \text{COCHCl}_2, \text{COCCl}_3, \text{COCF}_3, \text{COCH}_2\text{OMe}, \text{COCH}_2\text{OPh},$
 $\text{COCH}_2\text{CH}=\text{CHCH}_3, \text{CO}_2\text{Me}, \text{CO}_2\text{Et}, \text{CO}_2\text{Bu-t}, \text{CO}_2\text{Pr-i}, \text{CONHMe}, \text{CONMe}_2, \text{CONHEt}, \text{CONEt}_2, \text{CONPr-n}_2,$
30 $\text{CON}(\text{CH}_2\text{CH}=\text{CH}_2)_2, \text{CONMePh},$

30



- 35 $\text{CO}_2\text{CH}_2\text{Ph}, \text{CO}_2\text{Ph}, \text{SO}_2\text{Me}, \text{SO}_2\text{Et}, \text{SO}_2\text{CH}_2\text{CH}=\text{CH}_2, \text{SO}_2\text{Ph}, \text{SO}_2\text{Ph-Me-4}, \text{SO}_2\text{Ph-Cl-4}, \text{SO}_2\text{Ph}(\text{NO}_2)_2\text{-2,4},$
 $\text{SO}_2\text{CF}_3, \text{P}(=\text{O})(\text{OMe})_2, \text{P}(=\text{O})(\text{OEt})_2, \text{P}(=\text{O})(\text{OPr-n})_2, \text{P}(=\text{O})(\text{OPr-i})_2, \text{P}(=\text{S})(\text{OMe})_2, \text{P}(=\text{S})(\text{OEt})_2, \text{P}(=\text{O})-$
 $\text{OMeOPh}, \text{P}(=\text{O})(\text{OCH}_2\text{CH}=\text{CH}_2)_2, \text{P}(=\text{O})\text{OPhOCH}_2\text{CH}=\text{CH}_2$

When Q is a hydrogen atom, the compound may readily form a salt with a metal or with an organic base.

- 40 As such a metal, sodium, potassium, calcium, lithium, barium, magnesium, iron, copper, nickel or manganese may be mentioned.

- As such an organic base, methylamine, dimethylamine, trimethylamine, ethylamine, diethylamine, triethylamine, n-propylamine, di-n-propylamine, i-propylamine, di-i-propylamine, n-butylamine, i-butylamine, sec-butylamine, tert-butylamine, piperidine, pyrrolidine, morpholine, pyridine, N,N-dimethylaniline or choline
45 may be mentioned.

- In the course of researches on the herbicidal properties of various organic compounds with an aim to develop useful herbicides, the present inventors have found that the above-mentioned compound of the present invention exhibits excellent herbicidal activities against narrow leaf weeds (gramineous and cyperaceous weeds) and against broad leaf weeds and no substantial phytotoxicity against useful plants
50 e.g. crop plants such as Zea mays (corn), Sorghum bicolor (sorgo), Triticum spp (wheat) and Hordeum vulgare (barley). The present invention has been accomplished on the basis of this discovery.

- The compound of the present invention exhibits strong herbicidal activities in each of soil treatment, soil incorporation treatment and foliage treatment. On the other hand, it exhibits no phytotoxicity against crop plants such as Zea mays, Sorghum bicolor, Triticum spp and Hordeum vulgare in a practical application in
55 any of soil treatment, soil incorporation treatment and foliage treatment. Thus, the compound of the present invention has high selectivity and it is extremely effective for controlling weeds during the cultivation of these crop plants. Namely, the compound of the present invention exhibits strong herbicidal activities against noxious weeds such as Setaria viridis (green foxtail), Echinochloa crus-galli (barnyardgrass),

Amaranthus lividus (livid amaranth), Polygonum longisetum (persicaria blumei gross), Xanthium strumarium (cocklebur), Abutilon theophrasti (velvet leaf) and Cyperus esculentus (yellow nutsedge), which develop during the cultivation of Zea mays or Sorghum bicolor. The herbicidal activities against gramineous weeds and Cyperus esculentus are remarkably high and extremely unique. Heretofore, during the cultivation of Zea mays or Sorghum bicolor, it has been common to employ atrazine or cyanazine as a triazine-type herbicide, or alachlor or metolachlor as an acid anilide-type herbicide. However, atrazine and cyanazine have poor herbicidal activities against gramineous weeds although they show high activities against broad leaf weeds, and their activities against Cyperus esculentus are very low. On the other hand, alachlor and metolachlor have poor activities against broad leaf weeds although their activities against gramineous weeds are high, and their activities against Cyperus esculentus are very poor. Thus, it has been difficult to eradicate all the weed species by a single application of such herbicides.

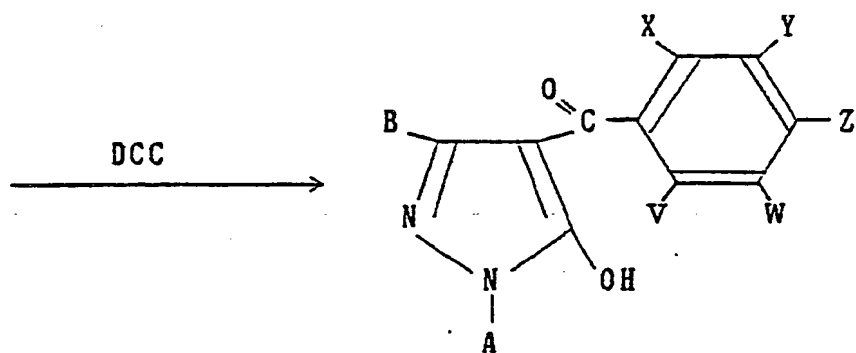
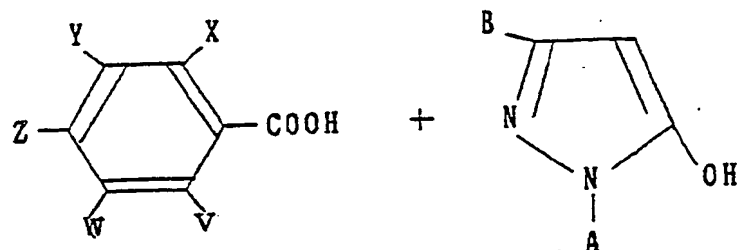
As a result of various studies, the present inventors have found the compound of the present invention which exhibits excellent herbicidal effects against a wide range of weeds, and the present invention has been accomplished on the basis of this discovery. The compound of the present invention also has a feature that it exhibits no phytotoxicity against crop plants such as Zea mays, Sorghum bicolor, Triticum spp and Hordeum vulgare and thus can safely be applied to the fields for such crop plants.

Further, the compound of the present invention includes a compound which shows selectivity between Oryza sativa (rice) and Echinochloa crus-galli (barnyardgrass), and it also includes a compound having selectivity for a useful plant such as Gossypium spp (cotton), Beta vulgaris (sugar beat) or Glycine max - (soybean).

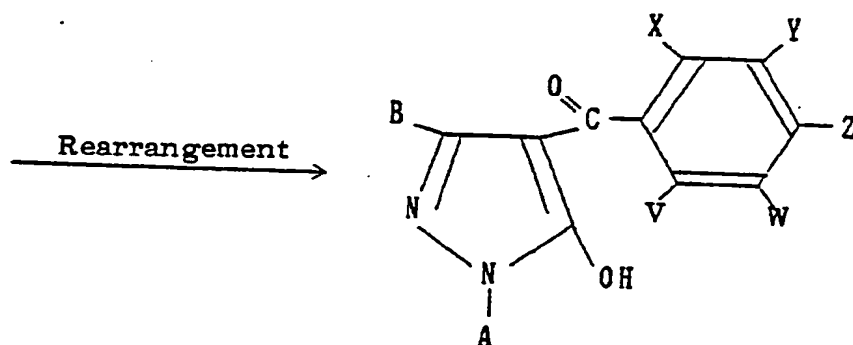
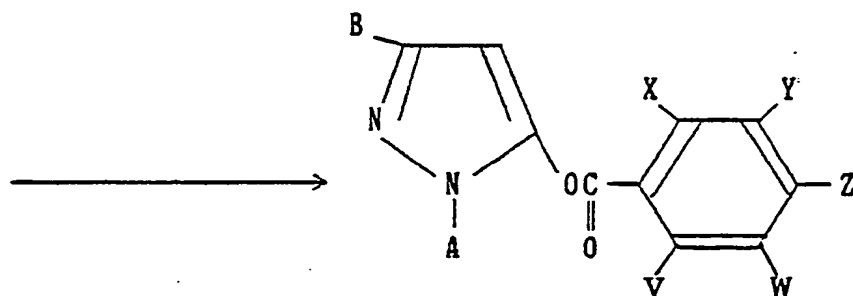
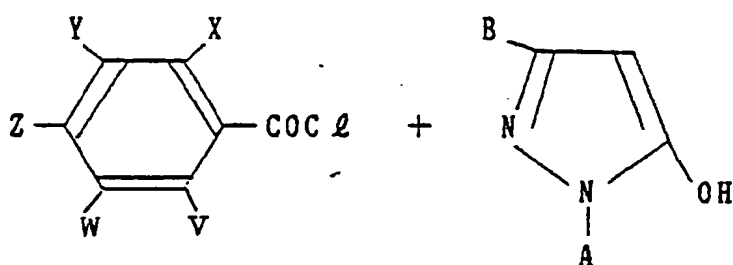
Heretofore, it has been known that 4-benzoylpyrazole derivatives have excellent herbicidal activities. For example, pyrazolate (common name) is commercially available and widely used for practical application. However, such conventional herbicides are restricted in their application to paddy fields, and their activities are very poor in their application to upland fields. Whereas, as a result of extensive research for many years on 4-benzoylpyrazole derivatives, the present inventors have finally found that the compound of the present invention which simultaneously satisfies the various conditions for substituents in the structure as specified above, exhibits strong herbicidal activities in the application to upland fields in each of soil treatment, soil incorporation and foliage treatment. It has been found that the compound of the present invention exhibits particularly high activities against gramineous weeds and Cyperus esculentus.

The compound of the present invention can readily be prepared by any one of the following reactions.

(1)



(2)



(3)

5

10

15

20

25

30

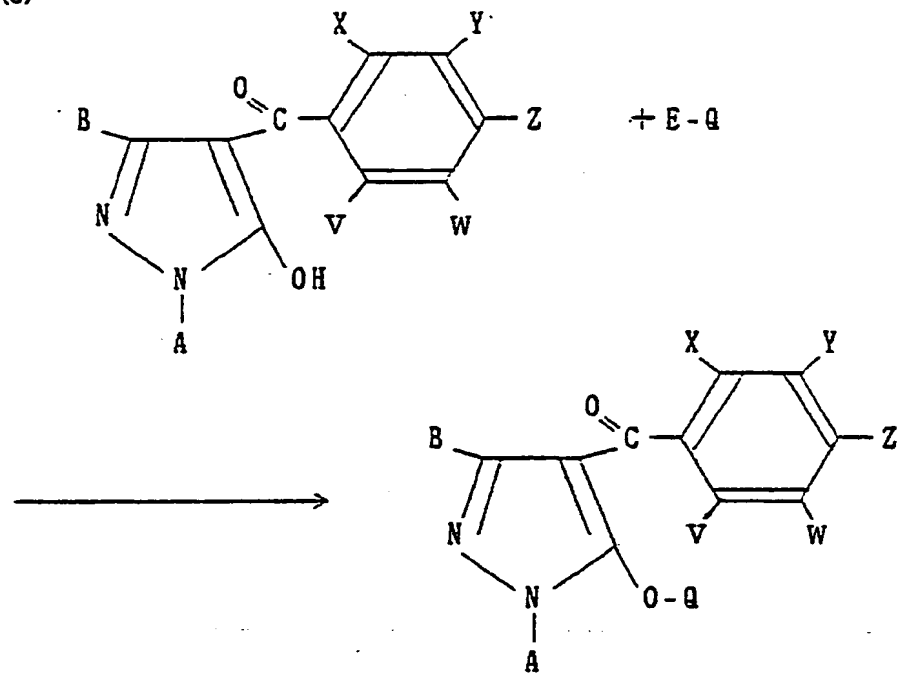
35

40

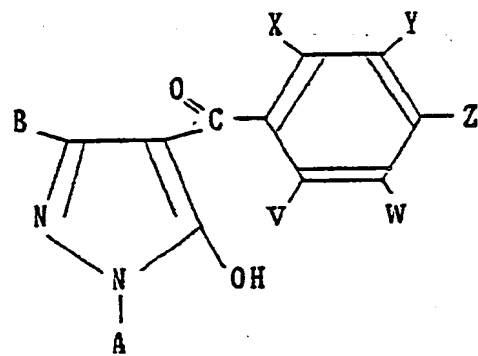
45

50

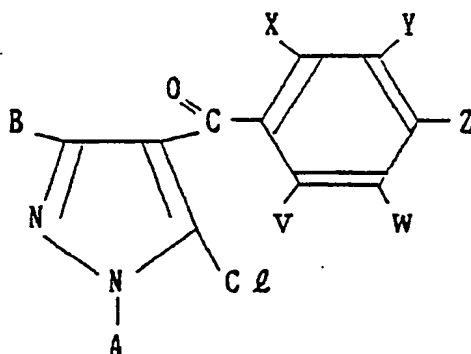
55



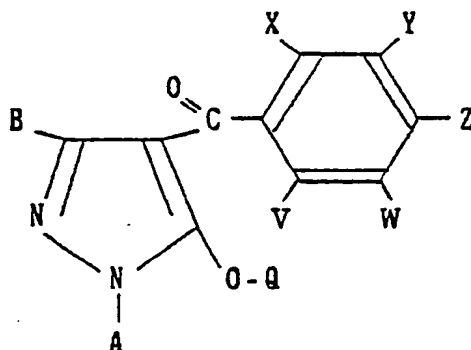
(4)



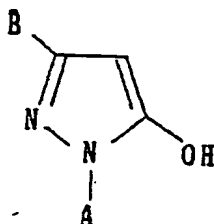
Chlorinating agent



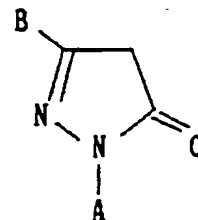
HO-Q



In the above formulas, A, B, X, Y, Z, Q, V and W are as defined above, E is a halogen atom, a
 30 m thanesulfonyloxy group or a p-toluenesulfonyloxy group. Further,



is a tautomer of



and may be represented by either formula. DCC is N,N'-dicyclohexylcarbodiimide.

Reaction scheme (1) represents a reaction wherein benzoic acid having suitable substituents and 5-
 45 hydroxypyrazole are reacted in an inert solvent in the presence of DCC and a base to obtain 4-benzoyl-5-
 hydroxypyrazole. DCC is used in an amount of from 1.0 to 1.5 mols per mol of the benzoic acid and
 pyrazole. The solvent may be any solvent so long as it is inert to the reaction. Particularly preferred is tert-
 butyl alcohol, tert-amyl alcohol or isopropyl alcohol. The base may not necessarily be required. However, in
 general, the yield can be improved by using a base. There is no particular restriction as to the base, but
 potassium carbonate or sodium carbonate may preferably be employed. The reaction temperature may
 50 range from room temperature to the boiling point of the solvent, but is preferably from 50 to 100°C.

The reaction time is usually from 0.5 to 20 hours.

Reaction scheme (2) shows a reaction wherein benzoyl chloride having suitable substituents and 5-
 hydroxypyrazole are reacted to form a benzoyl ester, which is then rearranged to a 4-benzoyl compound.

The benzoyl esterification can be accomplished in an inert solvent (such as an aromatic hydrocarbon, a
 55 fatty acid ester, a halogenated hydrocarbon, an ether, acetonitrile, dimethylsulfoxide or N,N'-dime-
 thylformamide) or in a two phase system with such a solvent and water or in a mixture of such solvents in
 the presence of a suitable dehydrochlorinating agent (e.g. an inorganic base such as sodium hydroxide,
 potassium hydroxide or sodium hydrogencarbonate, or an organic base such as pyridine or triethylamine) at
 a temperature of from room temperature to 100°C for from 10 minutes to 5 hours.

The rearrangement reaction can be accomplished by means of a Lewis acid such as anhydrous aluminum chloride or a base. As the base, potassium carbonate, calcium hydroxide or sodium carbonate may be used. The Lewis acid or base is used usually in an amount of from 1 to 10 mol times.

No solvent is required. However, in some cases, it is advantageous to use a solvent having a suitable boiling point to improve the operation efficiency or the yield. As such an advantageous example, use of dioxane or diglyme may be mentioned.

The reaction temperature is usually from 50 to 150°C, and the reaction time is usually from 15 minutes to 10 hours.

Reaction scheme (3) shows a reaction wherein 4-benzoyl-5-hydroxypyrazole is condensed with a halide, a methanesulfonic acid ester or a p-toluenesulfonic acid ester.

For this reaction, it is preferred to employ from 1 to 3 mol times of a dehydrohalogenating agent. As such a dehydrohalogenating agent, an inorganic base such as sodium hydroxide, potassium hydroxide, sodium carbonate, sodium hydrogencarbonate or potassium carbonate, or an organic base such as pyridine or triethylamine, may be mentioned.

There is no particular restriction as to the solvent so long as it is inert to the reaction. A wide range of solvents including an aromatic hydrocarbon, a fatty acid ester, a halogenated hydrocarbon, an ether, a ketone, an aliphatic hydrocarbon, acetonitrile, dimethylsulfoxide and dimethylformamide may be used.

The reaction temperature may be optionally selected within a range of from room temperature to the boiling point of the solvent. The reaction time is usually from 30 minutes to 30 hours.

Reaction scheme (4) shows a reaction wherein 4-benzoyl-5-hydroxypyrazole is converted to a 5-chloro compound by a chlorinating agent, followed by condensation with a suitable alcohol or acid.

As the chlorinating agent, phosphorus oxychloride, phosphorus pentachloride or thionyl chloride may be mentioned.

As the solvent, a wide range of solvents inert to the reaction, such as dimethylformamide, may be employed. However, the reaction can be conducted without any solvent.

The reaction temperature is preferably from 30 to 150°C, and the reaction time is usually from 30 minutes to 10 hours. In some cases, the reaction time may be shortened or the yield may be improved by an addition of a dehydrohalogenating agent.

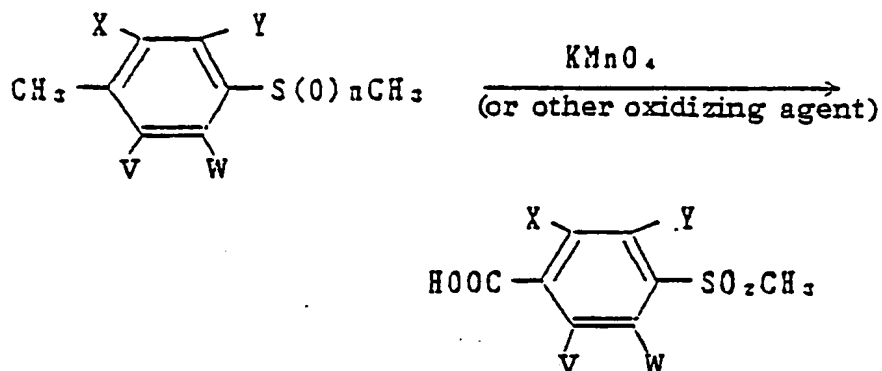
The condensation reaction with an alcohol or acid is conducted by an addition of a dehydrohalogenating agent.

As such a dehydrohalogenating agent, a base such as sodium hydroxide, potassium hydroxide, sodium carbonate, potassium carbonate, sodium alkoxide or sodium hydride may be employed.

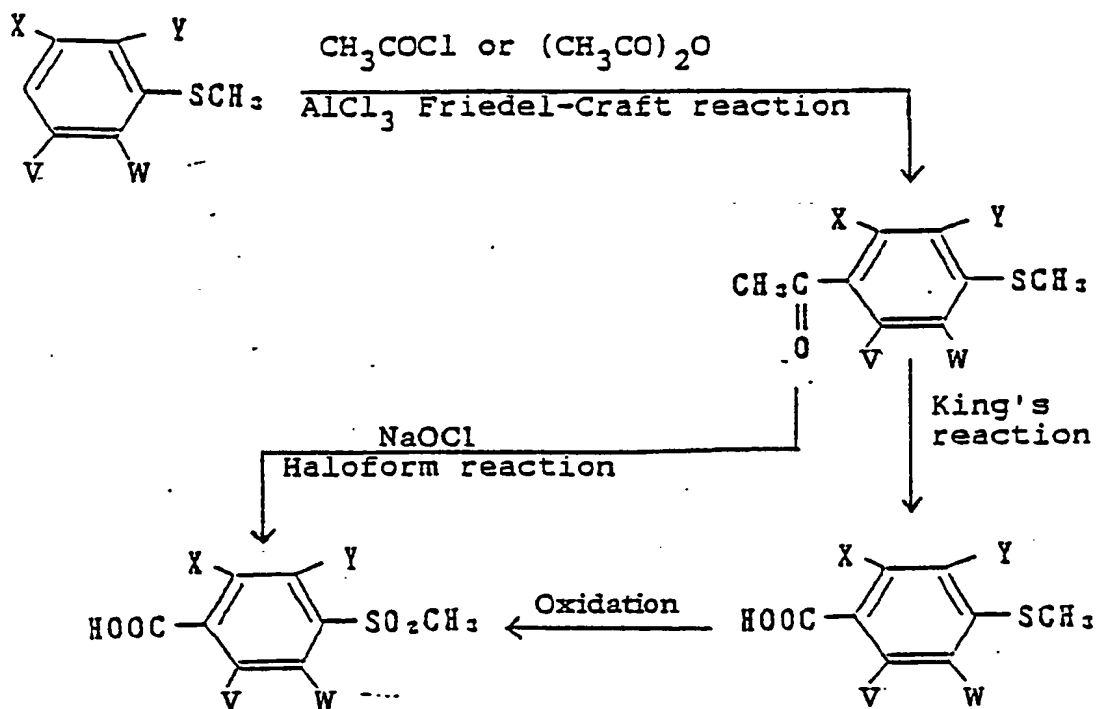
The solvent may be any solvent which is inert to the reaction (such as an aromatic hydrocarbon, an ether, a ketone or N,N'-dimethylformamide). The reaction temperature may be selected within a range of from room temperature to the boiling point of the solvent.

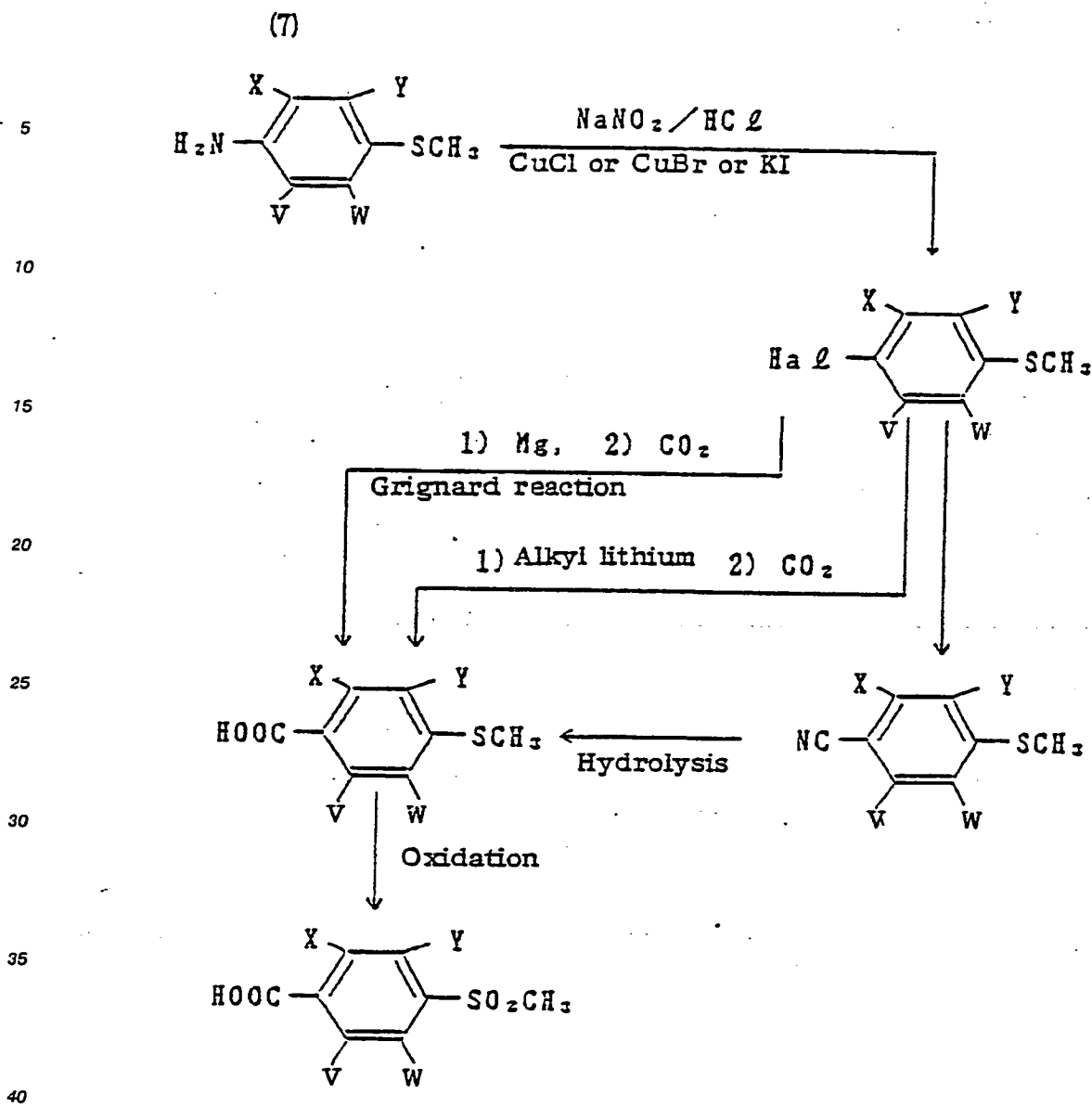
The benzoic acids or benzoyl chlorides used as the starting materials for the compounds of the present invention may readily be prepared by a proper combination of various known syntheses. For instance, compounds wherein the substituent Z in the benzene ring is -S(O)_nCH₃ can be prepared in accordance with the following reaction schemes.

(5)



(6)





In the above formulas, X, Y, V and W are as defined above, and Hal is a halogen atom.

Now, the preparation of benzoic acids will be described in detail with reference to Reference Examples. However, it should be understood that the present invention is by no means restricted by such specific

REFERENCE EXAMPLE 1

50 Preparation of 4-methanesulfonyl-3-methoxymethyl-2-methyl benzoic acid and 3-methoxymethyl-2-methyl-4-methylthio benzoic acid

(1) 2-Methyl-3-nitrobenzyl alcohol

55 39.0 g (0.2 mol) of methyl 2-methyl-3-nitrobenzoate was dissolved in 600 ml of tert-butanol, and 19.0 g of sodium borohydride was added thereto. Under refluxing, 150 ml of methanol was dropwise added thereto over a period of 1 hour. The refluxing was continued further for 1 hour to complete the reaction. The

reaction mixture was left to cool, and then water was added thereto. The solvent was distilled off under reduced pressure. To the residue, water and chloroform were added, and the organic layer was separated and dried over anhydrous sodium sulfate. Then, the solvent was distilled off to obtain 30.7 g of 2-methyl-3-nitrobenzyl alcohol.

(2) 2-Methyl-3-nitrobenzyl methyl ether

30.1 g (0.18 mol) of 2-methyl-3-nitrobenzyl alcohol obtained in the preceding step was dissolved in 200 ml of benzene, and 0.2 g of tetra-n-butylammonium bromide and a 50% aqueous solution of 20.1 g of sodium hydroxide were added thereto sequentially. Then, 27.2 g of dimethyl sulfate was dropwise added thereto at room temperature. Further, the reaction was conducted for 3 hours under stirring. Water was added to the reaction solution, and the organic layer was separated and washed sequentially with water, a 2% hydrochloric acid aqueous solution, water and a saturated sodium chloride aqueous solution. Then, the solvent was distilled off to obtain 30.9 g of 2-methyl-3-nitrobenzyl methyl ether as an oily substance.

(3) 3-Methoxymethyl-2-methylaniline

To 30.7 g (0.17 mol) of the above-mentioned 2-methyl-3-nitrobenzyl methyl ether, 200 ml of methanol was added. After the compound was dissolved in methanol, 92 ml of concentrated hydrochloric acid was gradually added thereto. Then, 30.4 g of iron powder was gradually added so that the reaction temperature became at a level of not higher than 60°C, and the reaction was continued further for 1 hour.

To the reaction solution, 300 ml of water was added, and sodium hydroxide was added until the pH became higher than 8. To the slurry thus obtained, chloroform was added, and the mixture was thoroughly stirred. Then, the solid was separated by filtration, and an organic layer was separated from the filtrate.

This organic layer was washed sequentially with water and a saturated sodium chloride aqueous solution and then dried over anhydrous sodium sulfate. Further, the solvent was distilled off under reduced pressure to obtain 23.1 g of 3-methoxymethyl-2-methylaniline as an oily substance.

(4) 3-Methoxymethyl-2-methyl-4-thiocyananiline

22.6 g (0.15 mol) of 3-methoxymethyl-2-methylaniline was dissolved in 300 ml of methanol. Then, 36.5 g of sodium thiocyanate was added thereto to obtain a uniform solution. This solution was cooled to 0°C, and 100 ml of a saturated methanol solution of sodium bromide with 25.2 g of bromine was dropwise added thereto so that the reaction temperature did not exceed 5°C. After the dropwise addition, the mixture was stirred at a temperature of not higher than 5°C for 1 hour and at room temperature for 1 hour to complete the reaction. The reaction solution was poured into 1 liter of water and neutralized with a 5% sodium carbonate aqueous solution. Chloroform was added to extract the oily substance. The chloroform layer was washed with water and a saturated sodium chloride aqueous solution and dried over anhydrous sodium sulfate. Then, the solvent was distilled off under reduced pressure to obtain 29.6 g of the desired product.

(5) 3-Methoxymethyl-2-methyl-4-methylthioaniline

29.1 g (0.14 mol) of 3-methoxymethyl-2-methyl-4-thiocyananiline was dissolved in 200 ml of ethanol and mixed with 100 ml of an aqueous solution containing 33.6 g of sodium sulfide nonahydrate at room temperature. Then, 21.9 g of methyl iodide was dropwise added thereto, and the mixture was reacted at room temperature for 3 hours. After completion of the reaction, the solvent was distilled off under reduced pressure, and water and chloroform were added to the residue. Then, the organic layer was separated and washed sequentially with water and a saturated sodium chloride aqueous solution and then dried over anhydrous sodium sulfate. The solvent was distilled off under reduced pressure to obtain 25.6 g of the desired product as an oily substance.

(6) 3'-Iodo-2'-methyl-6'-methylthiobenzyl methyl ether

To 25.6 g (0.13 mol) of 3-methoxymethyl-2-methyl-4-methylthioaniline, 100 ml of water and 33 ml of concentrated hydrochloric acid were added to convert it to an aniline hydrochloride. This solution was cooled to 0°C, and 30 ml of an aqueous solution containing 9.3 g of sodium nitrite was dropwise added thereto so that the reaction temperature did not exceed 5°C. After completion of dropwise addition, stirring was continued further for 30 minutes to complete diazotization. 100 ml of an aqueous solution containing 33 g of potassium iodide was heated to 70°C, and the aqueous solution of the diazonium salt obtained above was gradually added thereto and decomposed. The reaction solution was stirred further for 1 hour at 70°C and then left to cool. The oil component was extracted with benzene. The benzene layer was washed sequentially with water, a saturated sodium hydrogensulfite aqueous solution, water and a saturated sodium chloride aqueous solution. Then, the solvent was distilled off under reduced pressure, and the residue was purified by column chromatography (eluent: benzene) to obtain 30.0 g of the desired product. Melting point: 56.0 - 59.0°C.

(7) 3-Methoxymethyl-2-methyl-4-methylthiobenzoic acid

27.7 g (0.09 mol) of 3'-iodo-2'-methyl-6'-methylthiobenzyl methyl ether was dissolved in 100 ml of dried tetrahydrofuran, and 63 ml of a 1.5 M n-butyllithium n-hexane solution was dropwise added thereto at -70°C. After the dropwise addition, the mixture was stirred for 15 minutes at the same temperature, and then dried carbon dioxide gas was thoroughly blown into the reaction solution until the heat generation of the reaction solution stopped. After the reaction, the temperature of the solution was returned to room temperature, and water and diethyl ether were added for liquid separation. The aqueous layer thus obtained was further washed twice with diethyl ether, and then concentrated hydrochloric acid was added to bring the pH<1. Precipitated crystals were collected by filtration, thoroughly washed with water and dried to obtain 14.4 g of the desired product. Melting point: 192.0 - 194.0°C

(8) 4-Methanesulfonyl-3-methoxymethyl-2-methylbenzoic acid

To 11.3 g (0.05 mol) of 3-methoxymethyl-2-methyl-4-methylthiobenzoic acid, 120 ml of acetic acid and 120 ml of a 35% hydrogen peroxide aqueous solution were added, and the mixture was reacted at 80°C for 1 hour. After cooling, the reaction solution was poured into ice water, whereupon precipitated crystals were collected by filtration, then washed with water and dried to obtain 12.3 g of the desired product. Melting point: 129.0 - 131.0°C.

REFERENCE EXAMPLE 2

Preparation of 3-methoxycarbonyl-2-methyl-4-methylthiobenzoic acid and 4-methanesulfonyl-3-methoxycarbonyl-2-methylbenzoic acid

(1) Methyl 3-amino-2-methylbenzoate

40 g of methyl 2-methyl-3-nitrobenzoate was dissolved in 120 ml of methanol, and 157 g of concentrated hydrochloric acid was added thereto. Then, 36.8 g of iron powder was gradually added while maintaining the mixture at a temperature of not higher than 60°C. The mixture was stirred at room temperature for 4 hours and then poured into 1 liter of ice water. The solution was neutralized with sodium carbonate and extracted with chloroform (after filtering off insolubles). The extract was washed with a saturated sodium chloride aqueous solution and dried over anhydrous sodium sulfate. Then, the solvent was distilled off to obtain 27.8 g of the desired product as an oily substance.

(2) Methyl 3-amino-2-methyl-6-thiocyanobenzoate

While maintaining a solution comprising 27.7 g of methyl 3-amino-2-methylbenzoate, 41.5 g of sodium thiocyanate and 250 ml of methanol at a temperature of not higher than 0°C, 100 ml of sodium bromide-saturated methanol with 28.1 g of bromine was slowly dropwise added thereto. The mixture was stirred at room temperature for 3 hours and then poured into 1 liter of ice water. The solution was neutralized with sodium carbonate and then extracted with chloroform. The extract was washed with a saturated sodium chloride aqueous solution and dried over anhydrous sodium sulfate. Then, the solvent was distilled off to obtain 34.0 g of the desired product as an oily substance.

(3) Methyl 3-amino-2-methyl-6-methylthiobenzoate

To a solution comprising 39.5 g of sodium sulfide nonahydrate and 110 ml of water, a solution comprising 32.9 g of methyl 3-amino-2-methyl-6-thiocyanobenzoate and 300 ml of ethanol was dropwise added. The mixture was stirred at room temperature for 1.5 hours, and 24.0 g of methyl iodide was dropwise added under cooling with ice. The mixture was stirred further at room temperature for 2 hours and then concentrated under reduced pressure. A saturated sodium chloride aqueous solution was added thereto, and the mixture was extracted with chloroform. The extract was dried over anhydrous sodium sulfate. Then, the solvent was distilled off to obtain 30.1 g of the desired product as an oily substance.

(4) Methyl 3-iodo-2-methyl-6-methylthiobenzoate

28 g of methyl 3-amino-2-methyl-6-methylthiobenzoate was stirred in 150 ml of concentrated hydrochloric acid at room temperature for 2 hours to convert it to a hydrochloride. Then, while maintaining the mixture at a temperature of not higher than 0°C, a solution comprising 11.9 g of sodium nitrite and 20 ml of water was dropwise added thereto to obtain a diazonium salt solution. The diazonium salt solution was dropwise added to a solution comprising 28.4 g of potassium iodide and 90 ml of water while maintaining the solution at 80°C. After completion of the dropwise addition, the mixture was stirred at 80°C for 15 minutes and left to cool. Water was added thereto, and the mixture was extracted with chloroform. The extract was washed with an aqueous sodium hydrogensulfite solution and water and then dried over anhydrous sodium sulfate. The solvent was distilled off to obtain 40 g of the desired product as a crude product. The crude product was purified by silica gel column chromatography (eluted with benzene) to obtain 36.0 g of a purified product as an oily substance.

(5) 3-Methoxycarbonyl-2-methyl-4-methylthiobenzoic acid

While maintaining a solution comprising 20.0 g of methyl 3-iodo-2-methyl-6-methylthiobenzoate and 70 ml of dried tetrahydrofuran at a temperature of not higher than -60°C under a nitrogen atmosphere, 42 ml of a 1.5 M n-butyllithium n-hexane solution was dropwise added thereto. Fifteen minutes later, dried carbon dioxide gas was thoroughly blown into the mixture while maintaining it at a temperature of not higher than -50°C. After purging carbon dioxide gas with nitrogen, 12.7 g of diisopropylamine was dropwise added thereto, and the mixture was stirred until the temperature reached room temperature. The mixture was concentrated under reduced pressure. Water was added thereto and the mixture was washed with chloroform. The aqueous solution was acidified with concentrated hydrochloric acid and then extracted with chloroform. The extract was dried over anhydrous sodium sulfate. The solvent was distilled off to obtain 7.5 g of the desired product. Melting point: 178 - 178.5°C.

(6) 4-Methanesulfonyl-3-methoxycarbonyl-2-methylbenzoic acid

A solution comprising 5.0 g of 3-methoxycarbonyl-2-methyl-4-methylthiobenzoic acid, 25 ml of acetic acid and 25 ml of hydrogen peroxide (35%) was stirred at 80°C for 3 hours. After cooling, the mixture was poured into ice water and extracted with chloroform. The extract was dried over anhydrous sodium sulfate. Then, the solvent was distilled off to obtain 5.1 g of the desired product. Melting point: 151 - 152°C

REFERENCE EXAMPLE 3Preparation of 2-chloro-3-ethylthiomethyl-4-methanesulfonylbenzoic acid5 (1) Methyl 3-bromomethyl-2-chloro-4-methanesulfonylbenzoate

12.1 g of methyl 2-chloro-4-methanesulfonyl-3-methylbenzoate was dissolved in 250 ml of carbon tetrachloride, and the solution was refluxed under stirring. Then, 7.5 g of bromine and 1 g of benzoyl peroxide were gradually added thereto over a period of 30 minutes, and the solution was further refluxed for
 10 4 hours under heating. After cooling, 200 ml of chloroform was added thereto, and the mixture was washed with a 5% sodium hydrogensulfite aqueous solution. The organic layer was separated and dried over anhydrous sodium sulfate. The solvent was distilled off under reduced pressure to obtain a crude product. The crude product was washed with ethyl ether to obtain 13.2 g of crystals of the desired product. Melting point: 77 - 78°C

15

(2) Methyl 2-chloro-3-ethylthiomethyl-4-methanesulfonylbenzoate

To 100 ml of tetrahydrofuran, 1.3 g of ethanethiol and 1.5 g of potassium carbonate and then 4.4 g of
 20 methyl 3-bromomethyl-2-chloro-4-methanesulfonylbenzoate were added, and the mixture was stirred for 1 day at room temperature. Then, the mixture was stirred further for 1 hour at a temperature of from 50 to 60°C. After cooling, chloroform was added thereto, and the mixture was washed with a dilute potassium carbonate aqueous solution. The chloroform layer was separated and dried. Then, the solvent was distilled off to obtain 4.1 g of methyl 2-chloro-3-ethylthiomethyl-4-methanesulfonylbenzoate as an oily substance.

25

(3) 2-Chloro-3-ethylthiomethyl-4-methanesulfonylbenzoic acid

To a solution mixture comprising 50 ml of a 10% sodium hydroxide aqueous solution and 150 ml of
 30 methanol, 3.9 g of methyl 2-chloro-3-ethylthiomethyl-4-methanesulfonylbenzoate was added, and the mixture was stirred at room temperature for 30 minutes. Methanol was distilled off under reduced pressure, and a dilute hydrochloric acid was added to the residue for acid precipitation. The mixture was extracted with ethyl acetate, and the extract was dried. Then, the solvent was distilled off to obtain 3.5 g of the desired product. Melting point: 172 - 174°C.

35

REFERENCE EXAMPLE 4Preparation of 2-chloro-4-methanesulfonyl-3-methoxymethylbenzoic acid

40

(1) Methyl 2-chloro-4-methanesulfonyl-3-methoxymethylbenzoate

To a solution comprising 12.0 g of methyl 3-bromomethyl-2-chloro-4-methanesulfonylbenzoate prepared in Reference Example 3(1) and 100 ml of methanol, 50 ml of a methanol solution containing 1.7 g of sodium
 45 methoxide was added, and the mixture was stirred at room temperature overnight. The solvent was distilled off under reduced pressure. Then, dilute hydrochloric acid was added to the residue, and the mixture was extracted with chloroform. The extract was washed with water and dried over anhydrous sodium sulfate. Then, the solvent was distilled off to obtain 9.5 g of the desired product as a crude product. The crude product was purified by silica gel column chromatography (eluted with benzene) to obtain 7.5 g of a purified
 50 product as an oily substance.

55

(2) 2-Chloro-4-methanesulfonyl-3-methoxymethylbenzoic acid

To a solution comprising 3.0 g of methyl 2-chloro-4-methanesulfonyl-3-methoxymethylbenzoate and 20 ml of methanol, a solution comprising 0.57 g of sodium hydroxide (93%) and 2 ml of water was added, and the mixture was stirred at room temperature for 30 minutes. After an addition of 10 ml of water, the mixture was concentrated under reduced pressure. Then, dilute hydrochloric acid was added thereto, and the mixture was extracted with chloroform. The extract was dried over anhydrous sodium sulfate. Then, the solvent was distilled off to obtain 2.6 g of the desired product. Melting point: 137 - 141°C.

REFERENCE EXAMPLE 5Preparation of 2-chloro-4-methanesulfonyl-3-methoxymethylbenzoic acid (alternative method of Reference Example 4)

The desired product was prepared in the same manner as in Reference Example 1. Melting point: 137 - 141°C

The physical properties of the intermediates were as follows:

- (1) 2-Chloro-3-nitrobenzyl alcohol: Oily substance
- (2) 2'-Chloro-3'-nitrobenzyl methyl ether: Oily substance
- (3) 2-Chloro-3-methoxymethylaniline: Oily substance
- (4) 2-Chloro-3-methoxymethyl-4-thiocyananiline: Melting point: 90 - 98°C
- (5) 2-Chloro-3-methoxymethyl-4-methylthioaniline: Oily substance
- (6) 2'-Chloro-3'-iodo-6'-methylthiobenzyl methyl ether: Melting point: 53 - 56°C

REFERENCE EXAMPLE 6Preparation of 2-chloro-4-methanesulfonyl-3-methoxycarbonyl benzoic acid

The desired product was prepared in the same manner as in Reference Example 2. Melting point 160 - 162°C

The physical properties of the intermediates were as follows:

- (1) Methyl 3-amino-2-chlorobenzoate: Oily substance
- (2) Methyl 3-amino-2-chloro-6-thiocyanobenzoate: Melting point: 80 - 83°C
- (3) Methyl 3-amino-2-chloro-6-methylthiobenzoate: Melting point: 70 - 72°C
- (4) Methyl 2-chloro-3-iodo-6-methylthiobenzoate: Oily substance
- (5) 2-Chloro-3-methoxycarbonyl-4-methylthiobenzoic acid: Melting point: 176 - 179°C

REFERENCE EXAMPLE 7Preparation of 4-methanesulfonyl-3-[(2-methoxyethyl)oxycarbonyl]-2-methylbenzoic acid

The desired compound was prepared in the same manner as in Reference Example 2. Melting point: 118 - 121°C

The physical properties of the intermediates were as follows:

- (1) 2-Methoxyethyl 3-amino-2-methylbenzoate: Oily substance
- (2) 2-Methoxyethyl 3-amino-2-methyl-6-thiocyanobenzoate: Melting point: 79 - 81°C
- (3) 2-Methoxyethyl 3-amino-2-methyl-6-methylthiobenzoate: Oily substance
- (4) 2-Methoxyethyl 3-iodo-2-methyl-6-methylthiobenzoate: Oily substance
- (5) 3-[(2-methoxyethyl)oxycarbonyl]-2-methyl-4-methylthiobenzoic acid: Melting point: 90 - 93°C

REFERENCE EXAMPLE 8Preparation of 2-methyl-4-methylthio-3-n-propoxycarbonylbenzoic acid and 4-methanesulfonyl-2-methyl-3-n-propoxycarbonylbenzoic acid

(1) Methyl 3-bromo-2-methyl-6-methylthiobenzoate

16.1 g of the compound of Reference Example 2(3) was stirred in 150 ml of hydrobromic acid (48%) to convert it into a hydrobromide. While maintaining the solution at a temperature of not higher than 0°C, a solution comprising 7.2 g of sodium nitrite and 20 ml of water was dropwise added to obtain a diazonium salt solution. The diazonium salt solution was dropwise added to a solution comprising 6.0 g of cuprous bromide and 7.7 g of hydrobromic acid (48%) while refluxing the solution under heating. After completion of the dropwise addition, the mixture was further refluxed for 1 hour under heating and then left to cool. Ice water was added thereto, and the mixture was extracted with chloroform. The extract was washed with an aqueous sodium hydrogensulfite solution and water and then dried over anhydrous sodium sulfate. The solvent was distilled off to obtain 19.2 g of the desired product as a crude product. The crude product was purified by silica gel column chromatography (eluted with benzene) to obtain 17.1 g of a purified product as an oily substance.

(2) 3-Bromo-2-methyl-6-methylthiobenzoic acid

To 100 ml of an ethanol solution containing 17.0 g of methyl 3-bromo-2-methyl-6-methylthiobenzoate, 16 g of a 50% sodium hydroxide aqueous solution was added, and the mixture was refluxed for 3 hours under heating. The reaction mixture was concentrated under reduced pressure. Then, water was added thereto, and the mixture was washed with chloroform. The aqueous layer was acidified with concentrated hydrochloric acid and extracted with chloroform. The extract was dried over anhydrous sodium sulfate. The solvent was distilled off to obtain 15.9 g of the desired product. Melting point: 98 - 103°C

(3) n-Propyl 3-bromo-2-methyl-6-methylthiobenzoate

Thionyl chloride was added to 15.8 g of 3-bromo-2-methyl-6-methylthiobenzoic acid, and the mixture was refluxed for 4 hours under heating. Thionyl chloride was distilled off, and 70 ml of n-propanol was added to the residue under cooling with ice. Then, a solution comprising 7.3 g of pyridine and 20 ml of n-propanol was dropwise added thereto. The mixture was stirred at room temperature overnight and then concentrated under reduced pressure. Then, ethyl acetate was added thereto, and the mixture was washed sequentially with a 5% sodium carbonate aqueous solution, 10% hydrochloric acid and water and then dried over anhydrous sodium sulfate. Then, the solvent was distilled off under reduced pressure to obtain 18 g of the desired product as a crude product. The crude product was purified by silica gel column chromatography (eluted with benzene) to obtain 16.6 g of a purified product as an oily substance.

(4) 3-Bromo-2-methyl-6-methylthiobenzoic acid

This product was prepared in the same manner as in Reference Example 2(5). Melting point: 138 - 142°C

(5) 3-Bromo-6-methanesulfonyl-2-methylbenzoic acid

This compound was prepared in the same manner as in Reference Example 2(6). Melting point: 142 - 146°C

REFERENCE EXAMPLE 9Preparation of 2-chloro-3-isopropoxycarbonyl-4-methanesulfonylbenzoic acid

This compound was prepared from the compound of Reference Example 6(4) in the same manner as in Reference Example 8(2)-(5). Melting point: 146 - 148°C

The physical properties of the intermediates were as follows:

(1) 2-Chloro-3-iodo-6-methylthiobenzoic acid: Melting point: 155 - 159°C

- (2) Isopropyl 2-chloro-3-iodo-6-methylthiobenzoate: Oily substance
 (3) 2-Chloro-3-isopropoxycarbonyl-4-methylthiobenzoic acid: Melting point: 114 - 118°C

5 REFERENCE EXAMPLE 10

Preparation of 3-(1-methoxyethyl)-2-methyl-4-methylthiobenzoic acid and 4-methanesulfonyl-3-(1-methoxyethyl)-2-methylbenzoic acid

10 (1) 2'-Methyl-3'-nitroacetophenone

To 5.4 g of metal magnesium, 5 ml of absolute ethanol and 0.5 ml of carbon tetrachloride were dropwise added under a dry nitrogen stream. Further, 130 ml of dried diethyl ether was added under refluxing, and then a solution comprising 25 ml of a diethyl ether, 35.2 g of diethyl malonate and 20 ml of ethanol was dropwise added at a rate to maintain the refluxing. After completion of the dropwise addition, refluxing was continued for 3 hours to prepare diethyl ethoxymagnesiummalonate. To the solution of diethyl ethoxymagnesiummalonate thus obtained, 150 ml of a diethyl ether solution of 40.0 g of 2-methyl-3-nitrobenzoic acid chloride prepared from 2-methyl-3-nitrobenzoic acid and thionyl chloride, was dropwise added over a period of 20 minutes under refluxing, and the reaction was continued for 2 hours. After cooling, dilute sulfuric acid was added thereto for hydrolysis. The diethyl ether layer was washed sequentially with water and a saturated sodium chloride aqueous solution. Then, the solvent was distilled off under reduced pressure, and the residue was dried to obtain a crude product of diethyl 2-(2-methyl-3-nitrobenzoyl)malonate. To this crude product, a mixture comprising 7.5 ml of concentrated sulfuric acid, 60 ml of acetic acid and 40 ml of water was added, and the mixture was refluxed for 6 hours under heating. Then, the mixture was adjusted to pH 10 with a 20% sodium hydroxide aqueous solution. Precipitated oil component was extracted with chloroform. This chloroform layer was washed sequentially with water and a sodium chloride aqueous solution. Then, the solvent was distilled off under reduced pressure to obtain 34.0 g of the desired product. (Yield: 95%) Melting point: 53.0 - 54.0°C

30

(2) Preparation of 1-methyl-2'-methyl-3'-nitrobenzyl alcohol

To 50 ml of a methanol solution of 0.5 g of sodium hydroxide, 0.9 g of sodium borohydride was added at 0°C, and then 100 ml of a methanol solution of 14.3 g of 2'-methyl-3'-nitroacetophenone was dropwise added thereto. The temperature of the mixture was returned to room temperature and reacted for 1 hour. After the reaction, the reaction mixture was poured into water and extracted with benzene. The subsequent operation was conducted in a usual manner to obtain 14.3 g of the desired product as an oily substance. (Yield: 99%)

Subsequently, the synthesis was conducted in the same manner as in Reference Example 1 to obtain intermediates (3) to (9).

- (3) 1-Methyl-2'-methyl-3'-nitrobenzyl methyl ether: Oily substance
 (4) 1-Methyl-3'-amino-2'-methylbenzyl methyl ether: Oily substance
 (5) 1-Methyl-3'-amino-2'-methyl-6'-thiocyanobenzyl methyl ether: Solid
 (6) 1-Methyl-3'-amino-2'-methyl-6'-methylthiobenzyl methyl ether: Oily substance
 (7) 1-Methyl-3'-iodo-2'-methyl-6'-methylthiobenzyl: Oily substance
 (8) 3-(1-Methoxyethyl)-2-methyl-4-methylthiobenzoic acid: Oily substance
 (9) 4-Methanesulfonyl-3-(1-methoxyethyl)-2-methylbenzoic acid: Melting point: 106 - 109°C

50 REFERENCE EXAMPLE 11

Preparation of 2,4-dichloro-3-methoxycarbonylbenzoic acid

(1) 2,4-dichloro-3-nitrobenzoic acid

55

To a solution of 25 ml of fuming nitric acid and 20 ml of sulfuric acid, 25 g of 2,4-dichlorobenzoic acid was gradually added. After completion of the heat generation, the reaction mixture was poured into ice water. Precipitated solid was washed with water and dried to obtain 23.0 g of the desired product.

(2) Methyl 2,4-dichloro-3-nitrobenzoate

23.0 g of 2,4-dichloro-3-nitrobenzoic acid and 150 ml of thionyl chloride were refluxed for 6 hours under heating. Then, thionyl chloride was distilled off to obtain crude 2,4-dichloro-3-nitrobenzoyl chloride. 200 ml of methanol was added to the crude compound and refluxed under heating. Methanol was distilled off, and then ethyl acetate was added thereto to obtain an ethyl acetate solution. The solution was washed sequentially with a 5% sodium hydroxide aqueous solution, diluted hydrochloric acid and water. After drying, the solvent was distilled off to obtain 21.8 g of the desired product. Melting point: 72-74°C.

Subsequently, the synthesis was conducted in the same manner as in Reference Example 1 to obtain intermediates (3) and (4), and the desired product (5).

(3) Methyl 3-amino-2,4-dichlorobenzoate: Oily substance

(4) Methyl 2,4-dichloro-3-iodobenzoate: Oily substance

(5) 2,4-dichloro-3-methoxycarbonylbenzoic acid: Melting point: 183-185°C

15 REFERENCE EXAMPLE 12Preparation of 2-chloro-3-cyanomethyl-4-methanesulfonyl benzoic acid20 (1) Methyl 2-chloro-3-cyanomethyl-4-methanesulfonylbenzoate

5.0 g of methyl 3-bromomethyl-2-chloro-4-methanesulfonylbenzoate was added to a solution of 0.4 g of 18-crown-6 and 1.9 g of potassium cyanide in 50 ml of acetonitrile. The mixture was stirred for 72 hours at room temperature. After filtering off the solid, water was added to the filtrate, and the mixture was extracted with chloroform. After washing the extract with water and drying it, the solvent was distilled off to obtain a crude product. The crude product was purified by short silica gel column chromatography (eluent: chloroform) to obtain 4.1 g of the desired product. Melting point: 151-155°C.

30 (2) 2-chloro-3-cyanomethyl-4-methanesulfonylbenzoic acid

To 4.0 g of methyl 2-chloro-3-cyanomethyl-4-methanesulfonylbenzoate and 50 ml of methanol, 5 ml of an aqueous solution containing 0.72 g of sodium hydroxide (93%) was gradually added. The mixture was stirred for 15 minutes at room temperature. Then, the reaction mixture was neutralized with diluted hydrochloric acid, methanol was distilled off under reduced pressure and the concentrated solution was extracted with chloroform. After washing the extract with water and drying it, chloroform was distilled off to obtain 0.9 g of the desired product. Melting point: 169-172°C

40 REFERENCE EXAMPLE 13Preparation of 3-acetoxymethyl-2-chloro-4-methanesulfonyl benzoic acid(1) Methyl 3-acetoxymethyl-2-chloro-4-methanesulfonylbenzoate

50 ml of a DMF solution containing 5.0 g of methyl 3-bromomethyl-2-chloro-4-methanesulfonylbenzoate and 1.2 g of sodium acetate, was stirred for 2 hours at 100°C. After cooling, the reaction mixture was poured into ice water and extracted with chloroform. After washing the extract with water and drying it, the solvent was distilled off to obtain 4.2 g of the desired product. Melting point: 165-168°C

(2) 2-chloro-3-hydroxymethyl-4-methanesulfonylbenzoic acid

6 ml of an aqueous solution containing 1.3 g of sodium hydroxide (93%), was added to 3.9 g of methyl 3-acetoxymethyl-2-chloro-4-methanesulfonylbenzoate and 100 ml of methanol. The mixture was stirred for 30 minutes at room temperature. 50 ml of water was added thereto, and methanol was distilled off under reduced pressure. Then, the reaction mixture was acidified with hydrochloric acid and extracted with chloroform. The extract was concentrated to dryness to obtain 1.3 g of the desired product. Melting point: 240-245°C.

(3) 3-acetoxymethyl-2-chloro-4-methanesulfonylbenzoic acid

1.3 g of 2-chloro-3-hydroxymethyl-4-methanesulfonyl benzoic acid and 30 ml of acetic anhydride, was refluxed for 3 hours under heating. The reaction mixture was concentrated under reduced pressure. Then, 50 ml of water was added thereto and warmed for 1 hour. Precipitated solid was collected by filtration, washed with water and dried to obtain 1.35 g of the desired product. Melting point: 219-223°C.

REFERENCE EXAMPLE 14

Preparation of 2,4-dichloro-3-methoxymethylbenzoic acid

This compound was prepared in the same manner as in Reference Examples 3(1) and 4. Melting point: 130-136°C.

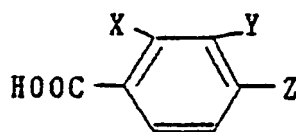
The physical properties of the intermediates were as follows:

(1) Methyl 3-bromomethyl-2,4-dichlorobenzoate: Melting point: 55-58°C

(2) Methyl 2,4-dichloro-3-methoxymethylbenzoate: Oily substance

The physical properties of benzoic acids prepared in accordance with the preceding Reference Examples will be given in Tables 1 and 2 including those of the preceding Reference Examples.

Table 1



10

X	Y	Z	Melting point (°C)
Me	CH ₂ OMe	SMe	192~194
Me	CH ₂ OMe	SO ₂ Me	129~131
Me	CO ₂ Me	SMe	178~178.5
Me	CO ₂ Me	SO ₂ Me	151~152
Me	CH ₂ OEt	SMe	172~175
Me	CH ₂ OEt	SO ₂ Me	160~162
Cl	CO ₂ Me	Cl	183~185
Me	CHMeOMe	SMe	Oily substance
Me	CHMeOMe	SO ₂ Me	106~109
Me	CO ₂ Pr-i	SMe	151~153
Me	CO ₂ Pr-i	SO ₂ Me	153~155
Cl	CH ₂ OMe	SO ₂ Me	137~141
Me	CH ₂ OPr-i	SMe	134~138
Me	CH ₂ OPr-i	SO ₂ Me	159~161

15

20

25

30

35

40

Table 1 (continued)




	X	Y	Z	Melting point (° C)
10	Me	CO ₂ CH ₂ CH ₂ OMe	SMe	90~93
	Me	CO ₂ CH ₂ CH ₂ OMe	SO ₂ Me	118~121
15	Cl	CH ₂ SEt	SO ₂ Me	172~174
	Me	CO ₂ Et	SMe	114~120
	Me	CO ₂ Et	SO ₂ Me	119.7~127.9
20	Cl	CH ₂ OCH ₂ CH ₂ OMe	SO ₂ Me	93~95
25	Cl	CH ₂ N 	SO ₂ Me	Oily substance
	Me	CO ₂ - 	SMe	169~172
30	Me	CO ₂ - 	SO ₂ Me	129~134
	Me	CO ₂ Pr-n	SMe	138~142
35	Me	CO ₂ Pr-n	SO ₂ Me	142~146
	Cl	CH ₂ OH	SO ₂ Me	240~245
40	Cl	CO ₂ Me	SMe	176~179
	Cl	CO ₂ Me	SO ₂ Me	160~162
45	Cl	CO ₂ Pr-i	SMe	114~118

Table 1 (continued)

5

10

15

20

25

30

35

40

45

50

55

X	Y	Z	Melting point (°C)
Cℓ	CO ₂ Pr-i	SO ₂ Me	146~148
OMe	CO ₂ Me	SMe	107~109
OMe	CO ₂ Me	SO ₂ Me	113~119
Me	CH ₂ OMe	SMe	Oily substance
Me	CH ₂ OMe	SO ₂ Me	Oily substance
Me	CH ₂ OMe	SMe	Oily substance
Me	CH ₂ OMe	SO ₂ Me	Oily substance
Cℓ	CH ₂ OCH ₂ C≡CH	SO ₂ Me	166~169
Cℓ	CH ₂ OCH ₂ CH=CH ₂	SO ₂ Me	118~119
Cℓ	CH ₂ OAm-n	SO ₂ Me	Oily substance
Me	CO ₂ Am-i	SMe	98~105
Me	CO ₂ Am-i	SO ₂ Me	107~113
Cℓ	CH ₂ OCH ₂ CF ₃	SO ₂ Me	155~157
OMe	CH ₂ OMe	SMe	157~161
OMe	CH ₂ OMe	SO ₂ Me	Oily substance
Me	CO ₂ CH ₂ CH ₂ Cℓ	SMe	138~144

Table 1 (continued)

X	Y	Z	Melting point (°C)
Me	CO ₂ CH ₂ CH ₂ Cl	SO ₂ Me	121 ~ 126
Cl	CH ₂ CN	SO ₂ Me	169 ~ 172
Cl	CH ₂ OAc	SO ₂ Me	219 ~ 223
Cl	CH ₂ OMe	Cl	130 ~ 136
Cl	CO ₂ Et	SO ₂ Me	156 ~ 159
Cl	CH=CHOMe (trans)	SO ₂ Me	146 ~ 149
Cl	CON(Et) ₂	SO ₂ Me	196 ~ 201

Table 2

5

10

15

20

25

30

35

40

45

50

55

X	Y	Z	¹ H-NMR (δ , ppm) [Solvent]
Me	CHEtOMe	SO ₂ Me	1.19(3H, t), 1.63(3H, d), 2.78(3H, s), 3.18(3H, s), 3.35(2H, q), 5.63(1H, q), 7.81(2H, A-B q), 10.20(1H, s) [CDC ℓ_3]
Me	CHMeOEt	SMe	1.00(3H, t), 1.67~2.26(2H, m), 2.46(3H, s), 2.69(3H, s), 3.21(3H, s), 4.91(1H, d-d) 7.48(2H, A-Bq), 10.2(1H, s) [CDC ℓ_3]
Me	CHMeOEt	SO ₂ Me	1.04(3H, t), 1.60~2.20(2H, m), 2.66(3H, s), 3.23(6H, s), 5.26(1H, d-d), 7.79(2H, A-B q) 9.0(1H, Broad s) [CDC ℓ_3 + DMSO-d ₆]
OMe	CH ₂ OMe	SO ₂ Me	3.04(3H, s), 3.24(3H, s), 3.71(3H, s), 4.71(2H, s), 7.71(2H, s), 8.88(1H, Broad s) [CDC ℓ_3 + DMSO-d ₆]

These benzoic acids can readily be led to benzoyl chlorides by chlorinating agents such as phosphorus pentachloride, thionyl chloride and sulfuryl chloride.

By using such benzoic acids or benzoyl chlorides, compounds of the present invention can be readily prepared in accordance with reaction schemes (1) to (4).

The present invention will be described in further detail with reference to Examples. However, it should be understood that the present invention is by no means restricted to such specific Examples.

10 EXAMPLE 1

Preparation of 1-ethyl-5-hydroxy-4-(4-methanesulfonyl-3-methoxymethyl-2-methylbenzoyl)pyrazole

1.12 g (0.01 mol) of 1-ethyl-5-hydroxypyrazole is dissolved in 30 ml of t-amyl alcohol, and then 2.59 g (0.01 mol) of 4-methanesulfonyl-3-methoxymethyl-2-methylbenzoic acid, 2.06 g (0.01 mol) of N,N'-dicyclohexylcarbodiimide and 0.69 g (0.005 mol) of anhydrous potassium carbonate were sequentially added thereto. The mixture was reacted at a temperature of from 80 to 90°C for 8 hours under stirring. After completion of the reaction, t-amyl alcohol was distilled off under reduced pressure, and 30 ml of water was added to the residue to dissolve the soluble components. The mixture was subjected to filtration to separate out the insolubles. The aqueous solution thus obtained was washed with chloroform, and concentrated hydrochloric acid was added to adjust pH<1. The precipitated oil component was extracted with chloroform. The solvent was distilled off under reduced pressure, and the residue was purified with silica gel column chromatography (eluent: ethyl acetate/ethanol = 9/1) to obtain 2.3 g of the desired product. (Yield: 66%, melting point: 116 - 118°C)

EXAMPLE 2

Preparation of 1-ethyl-5-hydroxy-4-(4-methanesulfonyl-3-methoxycarbonyl-2-methylbenzoyl)pyrazole

1.12 g (0.01 mol) of 1-ethyl-5-hydroxypyrazole was dissolved in 30 ml of t-amyl alcohol, and 2.72 g (0.01 mol) of 4-methanesulfonyl-3-methoxycarbonyl-2-methylbenzoic acid, 2.27 g (0.011 mol) of N,N'-dicyclohexylcarbodiimide and 0.76 g (0.0055 mol) of anhydrous potassium carbonate were sequentially added thereto. The mixture was reacted at 80°C for 6 hours under stirring. After completion of the reaction, t-amyl alcohol was distilled off under reduced pressure, and then water was added to the residue to dissolve the soluble component. The mixture was subjected to filtration to separate out the insolubles. The aqueous solution thus obtained was washed twice with chloroform, and then concentrated hydrochloric acid was added to adjust pH<1. The precipitated oil component was extracted with chloroform. The chloroform layer was washed sequentially with water and a saturated sodium chloride aqueous solution and then dried over anhydrous sodium sulfate. Then, the solvent was distilled off under reduced pressure, and the residue thus obtained was recrystallized from water/ethanol to obtain 2.26 g of the desired product. (Yield: 62%, melting point: 150 - 152°C)

45 EXAMPLE 3

Preparation of 5-hydroxy-(3-isopropoxycarbonyl-4-methanesulfonyl-2-methylbenzoyl)-1-methylpyrazole

The operation and treatment were conducted in the same manner as in Example 1 except that 1.12 g of 1-ethyl-5-hydroxypyrazole was changed to 0.98 g of 5-hydroxy-1-methylpyrazole, and 2.72 g of 4-methanesulfonyl-3-methoxycarbonyl-2-methylbenzoic acid was changed to 3.00 g of 3-isopropoxycarbonyl-4-methanesulfonyl-2-methylbenzoic acid, to obtain 1.71 g of the desired product. (Yield: 45%, melting point: 192 - 194°C)

55 EXAMPLE 4

Preparation of 4-(2-chloro-3-ethylthiomethyl-4-methanesulfonylbenzoyl)-1-ethyl-5-hydroxypyrazole

3 g of 2-chloro-3-ethylthiomethyl-4-methanesulfonylbenzoic acid, 0.72 g of potassium carbonate, 50 ml of t-amyl alcohol, 1.95 g of N,N'-dicyclohexylcarbodiimide and 4.5 g of a 25% t-amyl alcohol solution of 1-ethyl-5-pyrazolone were mixed and heated under stirring for 4 hours at a temperature of from 70 to 80°C. After cooling, the mixture was distilled under reduced pressure, and 200 ml of water was added to the residue. After filtering off the insolubles, the filtrate was washed with chloroform. Hydrochloric acid was added to the aqueous layer, and the mixture was extracted with chloroform. The extract was dried, and the solvent was distilled off to obtain the desired product as a crude product. The crude product was recrystallized from ethanol to obtain 1.88 g of the purified product. (Melting point: 142 - 145°C)

EXAMPLE 5

Preparation of 4-(2-chloro-5-ethanesulfonylmethyl-4-methanesulfonylbenzoyl)-1-ethyl-5-hydroxypyrazole

0.5 g of the compound obtained in Example 4 was dissolved in a solution comprising 30 ml of CHCl₃ and 30 ml of THF at room temperature, and 2.2 equivalent of m-chloroperbenzoic acid was added thereto under cooling in ice bath. The mixture was gradually returned to room temperature and stirred for 1 day. The solvent was distilled off, and crystals thus obtained were collected by filtration and washed with ethyl ether to obtain 2.2 g of the desired product. (Melting point: 133 - 135°C)

EXAMPLE 6

Preparation of 4-(2-chloro-3-ethanesulfinyl-4-methanesulfonylbenzoyl)-1-ethyl-5-hydroxypyrazole

0.45 g of the compound obtained in Example 4 was dissolved in 30 ml of dioxane, and 0.21 g of sodium bromite trihydrate was added thereto. The mixture was stirred at room temperature for 30 minutes, and then water was added thereto. The mixture was extracted with chloroform. The extract was dried, and the solvent was distilled off to obtain a crude product. The crude product was purified by column chromatography (eluted with chloroform/ethanol) to obtain 0.2 g of the desired product as an oily substance.

EXAMPLE 7

Preparation of 4-(2,4-dichloro-3-methoxycarbonylbenzoyl)-1-ethyl-5-hydroxypyrazole

This compound was prepared in the same manner as in Example 2. Melting point: 167-170°C.

EXAMPLE 8

Preparation of 5-benzyloxy-4-(2,4-dichloro-3-methoxycarbonylbenzoyl)-1-ethylpyrazole

A solution prepared by dissolving 0.3 g of the compound prepared in Example 7 and 0.1 g of triethylamine in 13 ml of benzene, was stirred at room temperature for 30 minutes, and then at 50°C for 3 hours. Insoluble substances were filtered off, and then the filtrate was concentrated under reduced pressure. The concentrated product was purified by silica gel column chromatography (eluent: benzene/ethyl acetate) to obtain 0.15 g of the desired product as an oily substance.

EXAMPLE 9

Preparation of 5-hydroxy-4-(4-methanesulfonyl-3-methoxymethyl-2-methylbenzoyl)-3-methoxymethyl-1-methylpyrazole

(1) 5-(4-methanesulfonyl-3-methoxymethyl-2-methylbenzoyl)oxy-3-methoxymethyl-1-methylpyrazole

1.9 g of 5-hydroxy-3-methoxymethylpyrazol was added to a mixture consisting of 8 ml of an aqueous solution containing 0.5 g of potassium hydroxide (85%) and 12 ml of chloroform, and then 4-methanesulfonyl-3-methoxymethyl-2-methylbenzoyl chloride was added thereto. The mixture was stirred for 3 hours at room temperature. Then, the reaction mixture was extracted with chloroform. The chloroform solution was washed with water and dried to obtain the desired product substantially quantitatively as an oily substance.

(2) 5-hydroxy-4-(4-methanesulfonyl-3-methoxymethyl-2-methylbenzoyl)-3-methoxymethyl-1-methylpyrazole

3.0 g of the compound obtained in step (1), 2.7 g of potassium carbonate and 8 ml of dioxane, were stirred at 120°C for 3.5 hours. 20 ml of water was added thereto and then the mixture was left to cool. The reaction solution was washed with chloroform and acidified with hydrochloric acid. The reaction solution was extracted with chloroform, washed with water and dried to obtain 1.8 g of a crude product. The crude product was recrystallized from ethanol to obtain 1.2 g of the desired product. Melting point: 100-104°C.

EXAMPLE 10

Preparation of 4-(3-acetoxymethyl-2-chloro-4-methanesulfonylbenzoyl)-1-ethyl-5-hydroxypyrazole

This compound was prepared in the same manner as in Example 2. Melting point: 140-144°C

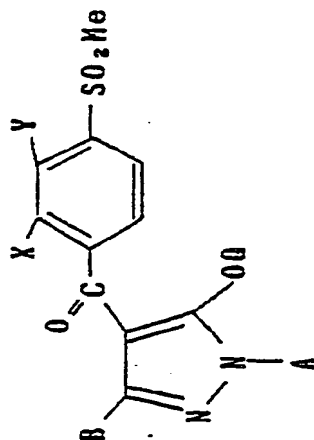
EXAMPLE 11

Preparation of 4-(2-chloro-3-hydroxymethyl-4-methanesulfonylbenzoyl)-1-ethyl-5-hydroxypyrazole

To 30 ml of a methanol solution containing 0.3 g of the compound prepared in Example 10, 5 ml of an aqueous solution containing 0.1 g of sodium hydroxide (93%) was added, and the mixture was stirred for 2 hours at room temperature. Methanol was distilled off under reduced pressure. Then, hydrochloric acid was added to the residue. The precipitated product was collected by filtration to obtain 0.2 g of the desired product. Melting point: 70-76°C.

The physical properties of the compounds prepared in the same manner as the preceding Examples will be given in Tables 3 and 4 including those of the preceding Examples.

Table 3



Compound No.	A	B	X	Y	Z	Q	Melting point (°C)
1	Me	II	Me	CH ₂ OMe	SO ₂ Me	II	Oily substance
2	Me	II	Me	CH ₂ OMe	SO ₂ Me	CH ₂ Ph	Oily substance
3	Et	II	Me	CH ₂ OMe	SO ₂ Me	II	116~118
4	i-Pr	II	Me	CH ₂ OMe	SO ₂ Me	II	Oily substance
5	Me	II	Me	CO ₂ H	SO ₂ Me	II	274~274.5
6	Me	II	Me	CO ₂ Me	SO ₂ Me	II	199~201
7	Et	II	Me	CO ₂ Me	SO ₂ Me	II	150~152

Table 3 (continued)

Compound No.	A	B	X	Y	Z	Q	Melting point (°C)
8	Me	II	Me	CO ₂ Et	SO ₂ Me	II	174~174.5
9	Et	II	Me	CO ₂ Et	SO ₂ Me	II	78~81
10	Me	II	Me	CO ₂ Pr-I	SO ₂ Me	II	192~194
11	Et	II	Me	CO ₂ Pr-I	SO ₂ Me	II	125~128
12	Me	II	Cl	CO ₂ Me	Cl	II	123~126
13	Me	II	Cl	CO ₂ Me	Cl	p-Ts	Oily substance
14	Me	II	Me	CH ₂ OEt	SO ₂ Me	II	178~179
15	Et	II	Me	CH ₂ OEt	SO ₂ Me	II	Oily substance
16	i-Pr	II	Me	CH ₂ OEt	SO ₂ Me	II	Oily substance
17	Me	Me	Me	CH ₂ OEt	SO ₂ Me	II	Oily substance
18	Me	II	Me	CHMeOMe	SO ₂ Me	II	238~240
19	Et	II	Me	CHMeOMe	SO ₂ Me	II	138~141
20	Me	II	Cl	CH ₂ OMe	SO ₂ Me	II	189~190

Table 3 (continued)

Compound No.	A	B	X	Y	Z	Q	Melting point(°C)
2 1	Et	II	Cℓ	CH ₂ OMe	SO ₂ Me	II	151 ~ 154
2 2	i-Pr	II	Cℓ	CH ₂ OMe	SO ₂ Me	II	142 ~ 144
2 3	Et	II	Me	CH ₂ OPr-i	SO ₂ Me	II	125 ~ 127
2 4	Me	II	Me	CO ₂ CH ₂ CH ₂ OMe	SO ₂ Me	II	114 ~ 117
2 5	Et	II	Me	CO ₂ CH ₂ CH ₂ OMe	SO ₂ Me	II	122 ~ 124
2 6	Me	II	Cℓ	CH ₂ OCH ₂ CH ₂ OMe	SO ₂ Me	II	157 ~ 161
2 7	Et	II	Cℓ	CH ₂ SEt	SO ₂ Me	II	142 ~ 145
2 8	Et	II	Cℓ	CH ₂ SOEt	SO ₂ Me	II	Oily substance
2 9	Et	II	Cℓ	CH ₂ SO ₂ Et	SO ₂ Me	II	133 ~ 135
3 0	Et	II	Me	CO ₂ Pr-n	SO ₂ Me	II	Oily substance

Table 3 (continued)



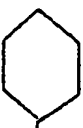
Compound No.	A	B	X	Y	Z	Q	Melting point (°C)
3 1	Me	II	C 2		SO ₂ Me	II	Oily substance
3 2	Me	II	Me		SO ₂ Me	II	220~222
3 3	Et	II	Me		SO ₂ Me	II	179~183
3 4	Me	II	C 2	CO ₂ Me	SO ₂ Me	II	183~185
3 5	Bt	II	C 2	CO ₂ Me	SO ₂ Me	II	174~176
3 6	Pr-1	II	C 2	CO ₂ Me	SO ₂ Me	II	138~140
3 7	Bt	II	C 2	CH ₂ OCCH ₂ C≡CH	SO ₂ Me	II	161 ~164
3 8	Me	II	C 2	CH ₂ OAm-n	SO ₂ Me	II	Oily substance
3 9	Bt	II	Me	CH ₂ OMe	SO ₂ Me	K	180~190
4 0	Et	II	Me	CH ₂ OMe	SO ₂ Me	Na	210~216
4 1	Bt	II	Me	CH ₂ OMe	SO ₂ Me	NH ₃ · Pr-1	95~102
4 2	Me	II	OMe	CO ₂ Me	SO ₂ Me	II	195~198

Table 3 (continued)

Compound No.	A	B	X	Y	Z	Q	Melting point (°C)
4 3	Me	II	Cℓ	CO ₂ Pr-i	SO ₂ Me	II	117~119
4 4	Et	II	Cℓ	CO ₂ Pr-i	SO ₂ Me	II	141~143
4 5	Me	II	Cℓ	CH ₂ OCH ₂ CP ₃	SO ₂ Me	II	167~170
4 6	Et	II	Me	CH ₂ OMe	SO ₂ Me	1/2 Ca	232~242
4 7	Pr-i	II	Me	CO ₂ Me	SO ₂ Me	II	116~121
4 8	Me	II	OMe	CH ₂ OMe	SO ₂ Me	II	154~157
4 9	Et	II	Me	CO ₂ CH ₂ CH ₂ Cℓ	SO ₂ Me	II	149~152
5 0	Et	II	OMe	CO ₂ Me	SO ₂ Me	II	172~175
5 1	Et	II	Cℓ	CO ₂ Me	Cℓ	II	167~170
5 2	Et	II	Cℓ	CO ₂ Me	Cℓ	CH ₂ -Ph	Oilly substance
5 3	Pr-i	II	Cℓ	CO ₂ Me	Cℓ	II	144~151

Table 3 (continued)

Compound No.	A	B	X	Y	Z	Q	Melting point (°C)
54	Pr-1	II	C ℓ	CO $_2$ Me	C ℓ	CH $_2$ -Ph	104~110
55	Me	CH $_2$ OMe	Me	CH $_2$ OMe	SO $_2$ Me	II	100~104
56	Et	II	C ℓ	CH $_2$ CN	SO $_2$ Me	II	235~239
57	Et	II	C ℓ	CH $_2$ OAc	SO $_2$ Me	II	140~144
58	Et	II	C ℓ	CH $_2$ OH	SO $_2$ Me	II	70~76
59	Et	II	Me	CO $_2$ Me	SHe	II	142~146
60	Et	II	C ℓ	CH $_2$ OMe	C ℓ	II	102~104
61	Et	II	C ℓ	CO $_2$ Et	SO $_2$ Me	II	100~104
62	Et	II	Me	CH $_2$ OMe	SHe	II	Oily substance
63	Me	II	C ℓ	CH $_2$ OMe	C ℓ	II	141~144
64	Et	II	C ℓ	CH=CHOMe (trans)	SO $_2$ Me	II	165~171
65	Pr-1	II	C ℓ	CO $_2$ Et	SO $_2$ Me	II	123~126
66	Et	II	OMe	CH $_2$ OMe	SO $_2$ Me	II	Oily substance
67	Et	II	Me	CHMeOEt	SO $_2$ Me	II	Oily substance
68	Et	II	Me	CHEtOMe	SO $_2$ Me	II	Oily substance
69	Et	II	C ℓ	CON(Et) $_2$	SO $_2$ Me	II	94~97

The compounds represented by the Compound Nos. in the following Table are the same as represented by the corresponding Compound Nos. in Table 3.

Table 4

Compound No.	¹ H-NMR (δ , ppm)	[Solvent]
1	2.47 (3H, s), 3.22 (3H, s), 3.50 (3H, s), 3.69 (3H, s), 4.96 (2H, s), 7.30 (1H, s), 7.78 (2H, A-Bq), 10.9 (1H) [CDC ℓ_3]	
2	2.41 (3H, s), 3.17 (3H, s), 3.50 (3H, s), 4.94 (2H, s), 5.53 (2H, s), 7.30~8.12 (8H, m) [CDC ℓ_3]	
3	1.44 (3H, t), 2.48 (3H, s), 3.23 (3H, s), 3.51 (3H, s), 4.07 (2H, q), 4.98 (2H, s), 7.36 (1H, s), 7.82 (2H, A-Bq) [CDC ℓ_3]	
4	1.48 (6H, d), 2.47 (3H, s), 3.19 (3H, s), 3.48 (3H, s), 4.53 (1H, m), 4.92 (2H, s), 7.18 (1H, s), 7.69 (2H, A-Bq), 9.57 (1H) [CDC ℓ_3]	

Table 4 (continued)

Compound No.	¹ H-NMR (δ , ppm)	[Solvent]
13	2.43(3H,s), 3.78(3H,s), 3.94 (3H,s), 7.24 ~7.81(7H,m)	[CDC ℓ_3]
15	1.07(3H,t), 2.27(3H,s), 3.01 (3H,s), 3.30 ~3.65(5H,m), 4.77(2H,s), 6.99(1H,s), 7.48(2H, A-B q), 8.22(1H,s)	[CDC ℓ_3]
28	1.45(3H,t), 3.04(2H,q), 4.05 (2H,q), 4.91(2H,q), 7.29(1H,s), 7.70 (1H,s), 7.85(2H,q)	[CDC ℓ_3]
30	0.91~2.03(8H,m), 2.41(3H,s), 3.20(3H,s), 3.91~4.47(4H,m), 7.36~8.08(4H,m)	[CDC ℓ_3]
16	1.26(3H,t), 1.49(3H,d), 2.49 (3H,s), 3.24(3H,s), 3.69(2H,q), 4.59 (1H,m), 5.00(2H,s), 7.28 ~8.14(4H,m), [CDC ℓ_3]	

Table 4 (continued)

5

10

15

20

25

30

35

40

45

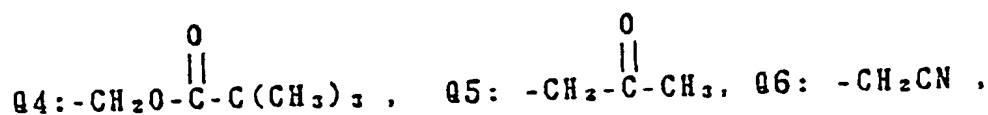
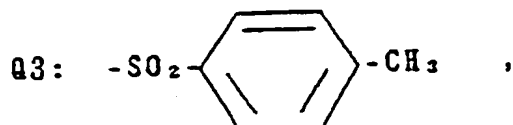
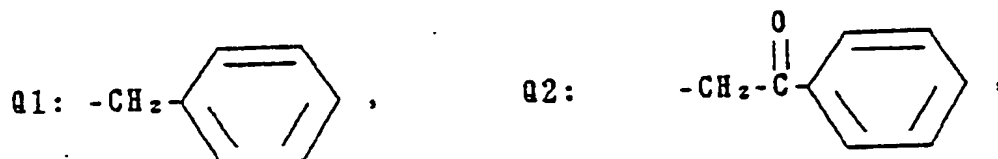
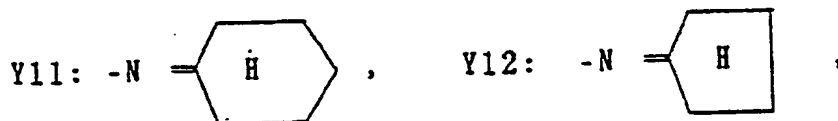
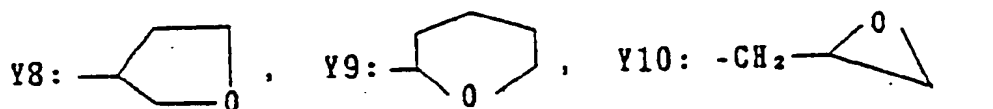
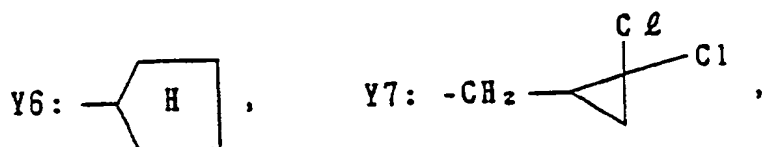
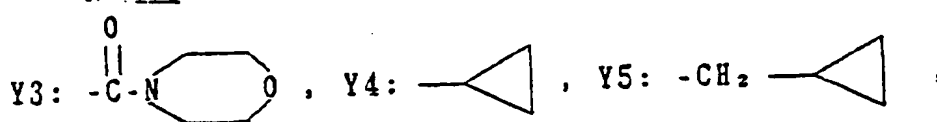
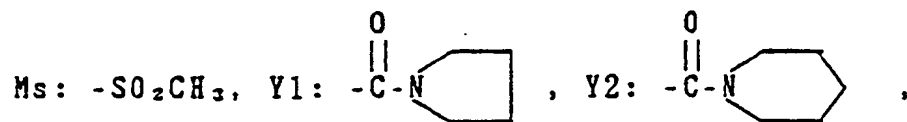
50

55

Compound No.	¹ H-NMR (δ , ppm)	[Solvent]
17	1.27(3H, t), 1.67(3H, s), 2.42 (3H, s), 3.23(3H, s), 3.63(3H, s), 3.68 (2H, q), 5.02(2H, s), 7.7 (1H, s), 7.75 (2H, A-B q) (CDC ℓ_3)	
62	1.45(3H, t), 2.49(6H, Broad s), 3.44(3H, s), 4.03(2H, q), 4.66 (2H, s), 7.29(2H, q), 7.39(1H, s),	
66	1.47(3H, t), 3.29(3H, s), 3.51(3H, s) 3.82(3H, s), 4.09(2H, q), 5.00 (2H, s), 7.50(1H, s), 7.84(2H, A-Bq), 7.96(1H, s) (CDC ℓ_3)	
67	1.07-1.67 (9H, m), 2.59(3H, s) 3.17(3H, s), 3.42(2H, t), 3.96 (2H, t), 5.61(1H, q), 7.27(1H, s), 7.61(2H, A-Bq) 9.66 (1H, Broad s) (CDC ℓ_3)	
68	1.09(3H, t), 1.45(3H, t), 2.55(3H, s) 3.16(3H, s), 3.27(3H, s), 3.70-4.20(4H, m), 5.13-5.36(1H, m), 7.14(1H, s), 7.60(2H, A-Bq), 9.46(1H, Broad s) (CDC ℓ_3)	

Compounds which can be prepared in the same manner as the preceding Examples will be given in Table 5 including those of the preceding Examples. However, the present invention is not restricted to such compounds.

5 Various symbols used in Table 5 has the following meanings.



55

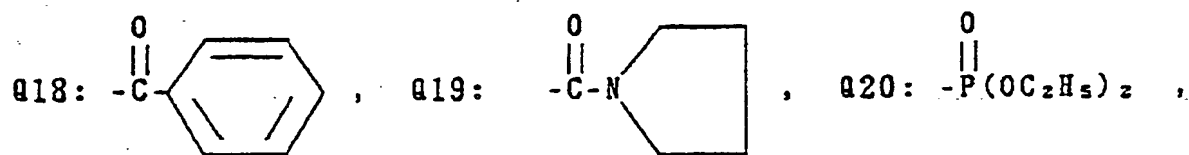
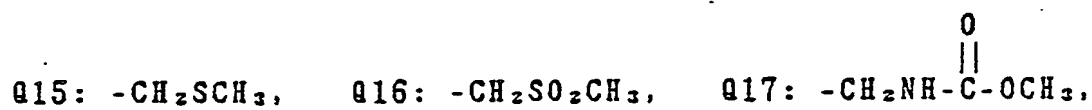
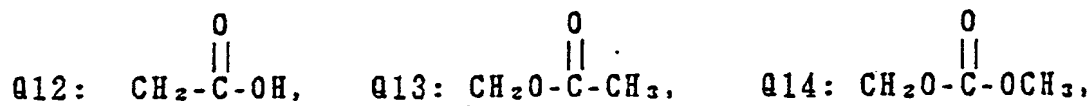
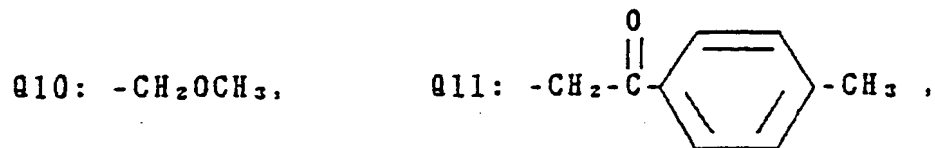
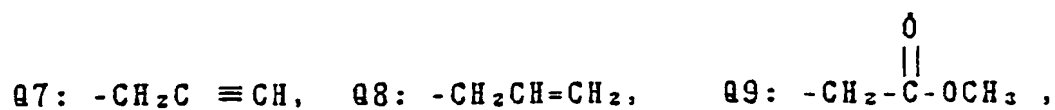
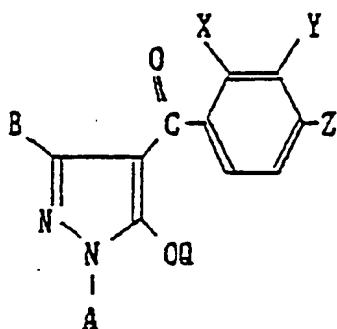


Table 5



	A	B	X	Y	Z	Q:
20	Me	H	Cl	COOMe	MeS	H
	Me	H	Cl	COOMe	MeSO	H
	Me	H	Cl	COOMe	Ms	H
	Me	H	Cl	COOMe	Ms	Q1
25	Me	H	Cl	COOMe	Ms	Q2
	Me	H	Cl	COOMe	Ms	Q3
	Me	H	Cl	COOMe	Ms	Q4
	Me	H	Cl	COOMe	Ms	Q5
30	Me	H	Cl	COOMe	Ms	Q6
	Me	H	Cl	COOMe	Ms	Q20
	Me	Me	Cl	COOMe	Ms	H
	Me	Cl	Cl	COOMe	Ms	H
	Me	CF ₃	Cl	COOMe	Ms	H
35	Me	OMe	Cl	COOMe	Ms	H
	Me	SMe	Cl	COOMe	Ms	H
	Me	H	Cl	COOEt	MeS	H
	Me	H	Cl	COOEt	MeSO	H
	Me	H	Cl	COOEt	Ms	H
40	Me	H	Cl	COOEt	Ms	Q1
	Me	H	Cl	COOEt	Ms	Q18
	Me	H	Cl	COOEt	Ms	Q13
	Me	H	Cl	COOEt	Ms	Q4
45	Me	H	Cl	COOEt	Ms	Q5
	Me	H	Cl	COOEt	Ms	Q6
	Me	H	Cl	COOEt	Ms	Q22
	Me	Me	Cl	COOEt	Ms	H
50	Me	Cl	Cl	COOEt	Ms	H

	A	B	X	Y	Z	Q
5	Me	CF ₃	Cl	COOEt	Ms	H
	Me	OMe	Cl	COOEt	Ms	H
	Me	SMe	Cl	COOEt	Ms	H
	Me	H	Cl	COOCH(CH ₃) ₂	MeS	H
10	Me	H	Cl	COOCH(CH ₃) ₂	MeSO	H
	Me	H	Cl	COOCH(CH ₃) ₂	Ms	H
	Me	H	Cl	COOCH(CH ₃) ₂	Ms	Q7
	Me	H	Cl	COOCH(CH ₃) ₂	Ms	Q12
15	Me	H	Cl	COOCH(CH ₃) ₂	Ms	Q9
	Me	H	Cl	COOCH(CH ₃) ₂	Ms	Q4
	Me	H	Cl	COOCH(CH ₃) ₂	Ms	Q5
	Me	H	Cl	COOCH(CH ₃) ₂	Ms	Q6
	Me	H	Cl	COOCH(CH ₃) ₂	Ms	Q17
20	Me	Me	Cl	COOCH(CH ₃) ₂	Ms	H
	Me	Cl	Cl	COOCH(CH ₃) ₂	Ms	H
	Me	CF ₃	Cl	COOCH(CH ₃) ₂	Ms	H
	Me	OMe	Cl	COOCH(CH ₃) ₂	Ms	H
	Me	SMe	Cl	COOCH(CH ₃) ₂	Ms	H
25	Me	H	Cl	COOEt	Cl	H
	Me	H	Cl	COOEt	Cl	Q1
	Me	H	Cl	COOEt	Cl	Q2
	Me	H	Cl	COOEt	Cl	Q3
30	Me	H	Cl	COOEt	Cl	H
	Me	H	Cl	COOEt	Cl	Q1
	Me	H	Cl	COOEt	Cl	Q2
	Me	H	Cl	COOEt	Cl	Q3
35	Me	H	Cl	COOCH(CH ₃) ₂	Cl	H
	Me	H	Cl	COOCH(CH ₃) ₂	Cl	Q1
	Me	H	Cl	COOCH(CH ₃) ₂	Cl	Q2
	Me	H	Cl	COOCH(CH ₃) ₂	Cl	Q3
	Me	H	Cl	CON(CH ₃) ₂	MeS	H
40	Me	H	Cl	CON(CH ₃) ₂	MeSO	H
	Me	H	Cl	CON(CH ₃) ₂	Ms	H
	Me	H	Cl	CON(CH ₃) ₂	Ms	Q1
	Me	H	Cl	CON(CH ₃) ₂	Ms	Q18
	Me	H	Cl	CON(CH ₃) ₂	Ms	Q13
45	Me	H	Cl	CON(CH ₃) ₂	Ms	Q4
	Me	H	Cl	CON(CH ₃) ₂	Ms	Q5
	Me	H	Cl	CON(CH ₃) ₂	Ms	Q6
	Me	H	Cl	CON(CH ₃) ₂	Ms	Q22

50

55

	A	B	X	Y	Z	Q
5	Me	Me	Cl	CON(CH ₃) ₂	Ms	H
	Me	Cl	Cl	CON(CH ₃) ₂	Ms	H
	Me	CF ₃	Cl	CON(CH ₃) ₂	Ms	H
	Me	OMe	Cl	CON(CH ₃) ₂	Ms	H
10	Me	SMe	Cl	CON(CH ₃) ₂	Ms	H
	Me	H	Cl	CON(CH ₃) ₂	Cl	H
	Me	H	Cl	CON(CH ₃) ₂	Cl	Q1
	Me	H	Cl	CON(CH ₃) ₂	Cl	Q2
15	Me	H	Cl	CON(CH ₃) ₂	Cl	Q3
	Me	H	Cl	COOC ₄ H ₉	Ms	H
	Me	H	Cl	COOC ₄ H ₉	Cl	H
	Me	H	Cl	COOCH ₂ CH(CH ₃) ₂	Ms	H
	Me	H	Cl	COOCH ₂ CH(CH ₃) ₂	Cl	H
20	Me	H	Cl	COOCH(CH ₃)C ₂ H ₅	Ms	H
	Me	H	Cl	COOCH(CH ₃)C ₂ H ₅	Cl	H
	Me	H	Cl	COOC(CH ₃) ₃	Ms	H
	Me	H	Cl	COOC(CH ₃) ₃	Cl	H
25	Me	H	Cl	CONHMe	Ms	H
	Me	H	Cl	CONHMe	Cl	H
	Me	H	Cl	CONHEt	Ms	H
	Me	H	Cl	CONHEt	Cl	H
30	Me	H	Cl	CONHCH(CH ₃) ₂	Ms	H
	Me	H	Cl	CONHCH(CH ₃) ₂	Cl	H
	Me	H	Cl	CONHC(CH ₃) ₃	Ms	H
	Me	H	Cl	CONHC(CH ₃) ₃	Cl	H
	Me	H	Cl	CONHC ₄ H ₉	Ms	H
35	Me	H	Cl	CONHC ₄ H ₉	Cl	H
	Me	H	Cl	CONHCH ₂ CH(CH ₃) ₂	Ms	H
	Me	H	Cl	CONHCH ₂ CH(CH ₃) ₂	Cl	H
	Me	H	Cl	CONHCH(CH ₃)C ₂ H ₅	Ms	H
	Me	H	Cl	CONHCH(CH ₃)C ₂ H ₅	Cl	H
40	Me	H	Cl	CONEt ₂	Ms	H
	Me	H	Cl	CONEt ₂	Cl	H
	Me	H	Cl	CON(CH(CH ₃) ₂) ₂	Ms	H
	Me	H	Cl	CON(CH(CH ₃) ₂) ₂	Cl	H
	Me	H	Cl	Y1	Ms	H
45	Me	H	Cl	Y1	Cl	H
	Me	H	Cl	Y2	Ms	H
	Me	H	Cl	Y2	Cl	H
	Me	H	Cl	Y3	Ms	H

50

55

	A	B	X	Y	Z	Q
5	Me	H	Cl	Y3	Cl	H
	Me	H	Cl	COOPh	Ms	H
	Me	H	Cl	COOPh	Cl	H
	Me	H	Cl	COOCH ₂ Ph	Ms	H
10	Me	H	Cl	COOCH ₂ Ph	Cl	H
	Me	H	Cl	COOCH ₂ CH=CH ₂	Ms	H
	Me	H	Cl	COOCH ₂ CH=CH ₂	Cl	H
	Me	H	Cl	COOCH ₂ C≡CH ₂	Ms	H
15	Me	H	Cl	COOCH ₂ C≡CH ₂	Cl	H
	Me	H	Cl	C(O)SMe	Ms	H
	Me	H	Cl	C(O)SMe	Cl	H
	Me	H	Cl	C(O)SEt	Ms	H
	Me	H	Cl	C(O)SEt	Cl	H
20	Me	H	Cl	C(O)SCH(CH ₃) ₂	Ms	H
	Me	H	Cl	C(O)SCH(CH ₃) ₂	Cl	H
	Me	H	Cl	C(O)SC ₃ H ₇	Ms	H
	Me	H	Cl	C(O)SC ₃ H ₇	Cl	H
25	Me	H	Cl	C(S)OMe	Ms	H
	Me	H	Cl	C(S)OMe	Cl	H
	Me	H	Cl	C(S)OEt	Ms	H
	Me	H	Cl	C(S)OEt	Cl	H
	Me	H	Cl	C(S)OCH(CH ₃) ₂	Ms	H
30	Me	H	Cl	C(S)OCH(CH ₃) ₂	Cl	H
	Me	H	Cl	C(S)SC ₃ H ₇	Ms	H
	Me	H	Cl	C(S)SC ₃ H ₇	Cl	H
	Me	H	Cl	C(S)SMe	Ms	H
35	Me	H	Cl	C(S)SMe	Cl	H
	Me	H	Cl	C(S)SEt	Ms	H
	Me	H	Cl	C(S)SEt	Cl	H
	Me	H	Cl	C(S)SCH(CH ₃) ₂	Ms	H
	Me	H	Cl	C(S)SCH(CH ₃) ₂	Cl	H
40	Me	H	Cl	C(S)SC ₃ H ₇	Ms	H
	Me	H	Cl	C(S)SC ₃ H ₇	Cl	H
	Me	H	Me	COOMe	MeS	H
	Me	H	Me	COOMe	MeSO	H
	Me	H	Me	COOMe	Ms	H
45	Me	H	Me	COOMe	Ms	Q1
	Me	H	Me	COOMe	Ms	Q2
	Me	H	Me	COOMe	Ms	Q3
	Me	H	Me	COOMe	Ms	Q4

50

55

	A	B	X	Y	Z	Q
5	Me	H	Me	COOMe	Ms	Q5
	Me	H	Me	COOMe	Ms	Q6
	Me	H	Me	COOMe	Ms	Q20
	Me	Me	Me	COOMe	Ms	H
10	Me	Cl	Me	COOMe	Ms	H
	Me	CF ₃	Me	COOMe	Ms	H
	Me	OMe	Me	COOMe	Ms	H
	Me	SMe	Me	COOMe	Ms	H
15	Me	H	Me	COOEt	MeS	H
	Me	H	Me	COOEt	MeSO	H
	Me	H	Me	COOEt	Ms	H
	Me	H	Me	COOEt	Ms	Q1
	Me	H	Me	COOEt	Ms	Q18
20	Me	H	Me	COOEt	Ms	Q13
	Me	H	Me	COOEt	Ms	Q4
	Me	H	Me	COOEt	Ms	Q5
	Me	H	Me	COOEt	Ms	Q6
	Me	H	Me	COOEt	Ms	Q22
25	Me	Me	Me	COOEt	Ms	H
	Me	Cl	Me	COOEt	Ms	H
	Me	CF ₃	Me	COOEt	Ms	H
	Me	OMe	Me	COOEt	Ms	H
30	Me	SMe	Me	COOEt	Ms	H
	Me	H	Me	COOCH(CH ₃) ₂	MeS	H
	Me	H	Me	COOCH(CH ₃) ₂	MeSO	H
	Me	H	Me	COOCH(CH ₃) ₂	Ms	H
	Me	H	Me	COOCH(CH ₃) ₂	Ms	Q7
35	Me	H	Me	COOCH(CH ₃) ₂	Ms	Q12
	Me	H	Me	COOCH(CH ₃) ₂	Ms	Q9
	Me	H	Me	COOCH(CH ₃) ₂	Ms	Q4
	Me	H	Me	COOCH(CH ₃) ₂	Ms	Q5
40	Me	H	Me	COOCH(CH ₃) ₂	Ms	Q6
	Me	Me	Me	COOCH(CH ₃) ₂	Ms	Q17
	Me	Cl	Me	COOCH(CH ₃) ₂	Ms	H
	Me	CF ₃	Me	COOCH(CH ₃) ₂	Ms	H
45	Me	OMe	Me	COOCH(CH ₃) ₂	Ms	H
	Me	SMe	Me	COOCH(CH ₃) ₂	Ms	H
	Me	H	Me	COOMe	Cl	H
	Me	H	Me	COOMe	Cl	Q1
50						
55						

	A	B	X	Y	Z	Q
5	Me	H	Me	COOMe	Cl	Q2
	Me	H	Me	COOMe	Cl	Q3
	Me	H	Me	COOEt	Cl	H
	Me	H	Me	COOEt	Cl	Q1
10	Me	H	Me	COOEt	Cl	Q2
	Me	H	Me	COOEt	Cl	Q3
	Me	H	Me	COOCH(CH ₃) ₂	Cl	H
	Me	H	Me	COOCH(CH ₃) ₂	Cl	Q1
15	Me	H	Me	COOCH(CH ₃) ₂	Cl	Q2
	Me	H	Me	COOCH(CH ₃) ₂	Cl	Q3
	Me	H	Me	CON(CH ₃) ₂	MeS	H
	Me	H	Me	CON(CH ₃) ₂	MeSO	H
	Me	H	Me	CON(CH ₃) ₂	Ms	H
20	Me	H	Me	CON(CH ₃) ₂	Ms	Q1
	Me	H	Me	CON(CH ₃) ₂	Ms	Q18
	Me	H	Me	CON(CH ₃) ₂	Ms	Q13
	Me	H	Me	CON(CH ₃) ₂	Ms	Q4
25	Me	H	Me	CON(CH ₃) ₂	Ms	Q5
	Me	H	Me	CON(CH ₃) ₂	Ms	Q6
	Me	H	Me	CON(CH ₃) ₂	Ms	Q22
	Me	Me	Me	CON(CH ₃) ₂	Ms	H
	Me	Cl	Me	CON(CH ₃) ₂	Ms	H
30	Me	CF ₃	Me	CON(CH ₃) ₂	Ms	H
	Me	OMe	Me	CON(CH ₃) ₂	Ms	H
	Me	SMe	Me	CON(CH ₃) ₂	Ms	H
	Me	H	Me	CON(CH ₃) ₂	Cl	H
	Me	H	Me	CON(CH ₃) ₂	Cl	Q1
35	Me	H	Me	CON(CH ₃) ₂	Cl	Q2
	Me	H	Me	CON(CH ₃) ₂	Cl	Q3
	Me	H	Me	COOC ₄ H ₉	Ms	H
	Me	H	Me	COOC ₄ H ₉	Cl	H
40	Me	H	Me	COOCH ₂ CH(CH ₃) ₂	Ms	H
	Me	H	Me	COOCH ₂ CH(CH ₃) ₂	Cl	H
	Me	H	Me	COOCH(CH ₃)C ₂ H ₅	Ms	H
	Me	H	Me	COOCH(CH ₃)C ₂ H ₅	Cl	H
	Me	H	Me	COOC(CH ₃) ₃	Ms	H
45	Me	H	Me	COOC(CH ₃) ₃	Cl	H
	Me	H	Me	CONHMe	Ms	H
	Me	H	Me	CONHMe	Cl	H
	Me	H	Me	CONHEt	Ms	H
50						
55						

	A	B	X	Y	Z	Q
5	Me	H	Me	CONHEt	Cl	H
	Me	H	Me	CONHCH(CH ₃) ₂	Ms	H
	Me	H	Me	CONHCH(CH ₃) ₂	Cl	H
	Me	H	Me	CONHC(CH ₃) ₃	Ms	H
10	Me	H	Me	CONHC(CH ₃) ₃	Cl	H
	Me	H	Me	CONHC ₄ H ₉	Ms	H
	Me	H	Me	CONHC ₄ H ₉	Cl	H
	Me	H	Me	CONHCH ₂ CH(CH ₃) ₂	Ms	H
15	Me	H	Me	CONHCH ₂ CH(CH ₃) ₂	Cl	H
	Me	H	Me	CONHCH(CH ₃)C ₂ H ₅	Ms	H
	Me	H	Me	CONHCH(CH ₃)C ₂ H ₅	Cl	H
	Me	H	Me	CONEt ₂	Ms	H
	Me	H	Me	CONEt ₂	Cl	H
20	Me	H	Me	CON(CH(CH ₃) ₂) ₂	Ms	H
	Me	H	Me	CON(CH(CH ₃) ₂) ₂	Cl	H
	Me	H	Me	Y1	Ms	H
	Me	H	Me	Y1	Cl	H
25	Me	H	Me	Y2	Ms	H
	Me	H	Me	Y2	Cl	H
	Me	H	Me	Y3	Ms	H
	Me	H	Me	Y3	Cl	H
	Me	H	Me	COOPh	Ms	H
30	Me	H	Me	COOPh	Cl	H
	Me	H	Me	COOCH ₂ Ph	Ms	H
	Me	H	Me	COOCH ₂ Ph	Cl	H
	Me	H	Me	COOCH ₂ CH=CH ₂	Ms	H
	Me	H	Me	COOCH ₂ CH=CH ₂	Cl	H
35	Me	H	Me	COOCH ₂ C≡CH	Ms	H
	Me	H	Me	COOCH ₂ C≡CH	Cl	H
	Me	H	Me	C(O)SMe	Ms	H
	Me	H	Me	C(O)SMe	Cl	H
40	Me	H	Me	C(O)SEt	Ms	H
	Me	H	Me	C(O)SEt	Cl	H
	Me	H	Me	C(O)SCH(CH ₃) ₂	Ms	H
	Me	H	Me	C(O)SCH(CH ₃) ₂	Cl	H
	Me	H	Me	C(O)SC ₃ H ₇	Ms	H
45	Me	H	Me	C(O)SC ₃ H ₇	Cl	H
	Me	H	Me	C(S)OMe	Ms	H
	Me	H	Me	C(S)OMe	Cl	H
	Me	H	Me	C(S)OEt	Ms	H

50

55

	A	B	X	Y	Z	Q
5	Me	H	Me	C(S)OEt	Cl	H
	Me	H	Me	C(S)OCH(CH ₃) ₂	Ms	H
	Me	H	Me	C(S)OCH(CH ₃) ₂	Cl	H
10	Me	H	Me	C(S)SC ₃ H ₇	Ms	H
	Me	H	Me	C(S)SC ₃ H ₇	Cl	H
	Me	H	Me	C(S)SMe	Ms	H
	Me	H	Me	C(S)SMe	Cl	H
	Me	H	Me	C(S)SEt	Ms	H
15	Me	H	Me	C(S)SEt	Cl	H
	Me	H	Me	C(S)SCH(CH ₃) ₂	Ms	H
	Me	H	Me	C(S)SCH(CH ₃) ₂	Cl	H
	Me	H	Me	C(S)SC ₃ H ₇	Ms	H
	Me	H	Me	C(S)SC ₃ H ₇	Cl	H
20	Me	H	OMe	COOMe	MeS	H
	Me	H	OMe	COOMe	MeSO	H
	Me	H	OMe	COOMe	Ms	H
	Me	H	OMe	COOMe	Ms	Q1
25	Me	H	OMe	COOMe	Ms	Q2
	Me	H	OMe	COOMe	Ms	Q3
	Me	H	OMe	COOMe	Ms	Q4
	Me	H	OMe	COOMe	Ms	Q5
	Me	H	OMe	COOMe	Ms	Q6
30	Me	H	OMe	COOMe	Ms	Q20
	Me	Me	OMe	COOMe	Ms	H
	Me	Cl	OMe	COOMe	Ms	H
	Me	CF ₃	OMe	COOMe	Ms	H
	Me	OMe	OMe	COOMe	Ms	H
35	Me	SMe	OMe	COOMe	Ms	H
	Me	H	OMe	COOEt	MeS	H
	Me	H	OMe	COOEt	MeSO	H
	Me	H	OMe	COOEt	Ms	H
40	Me	H	OMe	COOEt	Ms	Q1
	Me	H	OMe	COOEt	Ms	Q18
	Me	H	OMe	COOEt	Ms	Q13
	Me	H	OMe	COOEt	Ms	Q4
	Me	H	OMe	COOEt	Ms	Q5
45	Me	H	OMe	COOEt	Ms	Q6
	Me	H	OMe	COOEt	Ms	Q22
	Me	Me	OMe	COOEt	Ms	H
	Me	Cl	OMe	COOEt	Ms	H
50						
55						

	A	B	X	Y	Z	Q
5	Me	CF ₃	OMe	COOEt	Ms	H
	Me	OMe	OMe	COOEt	Ms	H
	Me	SMe	OMe	COOEt	Ms	H
	Me	H	OMe	COOCH(CH ₃) ₂	MeS	H
10	Me	H	OMe	COOCH(CH ₃) ₂	MeSO	H
	Me	H	OMe	COOCH(CH ₃) ₂	Ms	H
	Me	H	OMe	COOCH(CH ₃) ₂	Ms	Q7
	Me	H	OMe	COOCH(CH ₃) ₂	Ms	Q12
15	Me	H	OMe	COOCH(CH ₃) ₂	Ms	Q9
	Me	H	OMe	COOCH(CH ₃) ₂	Ms	Q4
	Me	H	OMe	COOCH(CH ₃) ₂	Ms	Q5
	Me	H	OMe	COOCH(CH ₃) ₂	Ms	Q6
	Me	H	OMe	COOCH(CH ₃) ₂	Ms	Q17
20	Me	Me	OMe	COOCH(CH ₃) ₂	Ms	H
	Me	Cl	OMe	COOCH(CH ₃) ₂	Ms	H
	Me	CF ₃	OMe	COOCH(CH ₃) ₂	Ms	H
	Me	OMe	OMe	COOCH(CH ₃) ₂	Ms	H
25	Me	SMe	OMe	COOCH(CH ₃) ₂	Ms	H
	Me	H	OMe	COOMe	Cl	H
	Me	H	OMe	COOMe	Cl	Q1
	Me	H	OMe	COOMe	Cl	Q2
	Me	H	OMe	COOMe	Cl	Q3
30	Me	H	OMe	COOEt	Cl	H
	Me	H	OMe	COOEt	Cl	Q1
	Me	H	OMe	COOEt	Cl	Q2
	Me	H	OMe	COOEt	Cl	Q3
35	Me	H	OMe	COOCH(CH ₃) ₂	Cl	H
	Me	H	OMe	COOCH(CH ₃) ₂	Cl	Q1
	Me	H	OMe	COOCH(CH ₃) ₂	Cl	Q2
	Me	H	OMe	COOCH(CH ₃) ₂	Cl	Q3
	Me	H	OMe	CON(CH ₃) ₂	MeS	H
40	Me	H	OMe	CON(CH ₃) ₂	MeSO	H
	Me	H	OMe	CON(CH ₃) ₂	Ms	H
	Me	H	OMe	CON(CH ₃) ₂	Ms	Q1
	Me	H	OMe	CON(CH ₃) ₂	Ms	Q18
	Me	H	OMe	CON(CH ₃) ₂	Ms	Q13
45	Me	H	OMe	CON(CH ₃) ₂	Ms	Q4
	Me	H	OMe	CON(CH ₃) ₂	Ms	Q5
	Me	H	OMe	CON(CH ₃) ₂	Ms	Q6
	Me	H	OMe	CON(CH ₃) ₂	Ms	Q22

50

55

	A	B	X	Y	Z	Q
5	Me	Me	OMe	CON(CH ₃) ₂	Ms	H
	Me	Cl	OMe	CON(CH ₃) ₂	Ms	H
	Me	CF ₃	OMe	CON(CH ₃) ₂	Ms	H
	Me	OMe	OMe	CON(CH ₃) ₂	Ms	H
10	Me	SMe	OMe	CON(CH ₃) ₂	Ms	H
	Me	H	OMe	CON(CH ₃) ₂	Cl	H
	Me	H	OMe	CON(CH ₃) ₂	Cl	Q1
	Me	H	OMe	CON(CH ₃) ₂	Cl	Q2
15	Me	H	OMe	CON(CH ₃) ₂	Cl	Q3
	Me	H	OMe	COOC ₄ H ₉	Ms	H
	Me	H	OMe	COOC ₄ H ₉	Cl	H
	Me	H	OMe	COOCH ₂ CH(CH ₃) ₂	Ms	H
	Me	H	OMe	COOCH ₂ CH(CH ₃) ₂	Cl	H
20	Me	H	OMe	COOCH(CH ₃)C ₂ H ₅	Ms	H
	Me	H	OMe	COOCH(CH ₃)C ₂ H ₅	Cl	H
	Me	H	OMe	COOC(CH ₃) ₃	Ms	H
	Me	H	OMe	COOC(CH ₃) ₃	Cl	H
25	Me	H	OMe	CONHMe	Ms	H
	Me	H	OMe	CONHMe	Cl	H
	Me	H	OMe	CONHEt	Ms	H
	Me	H	OMe	CONHEt	Cl	H
	Me	H	OMe	CONHCH(CH ₃) ₂	Ms	H
30	Me	H	OMe	CONHCH(CH ₃) ₂	Cl	H
	Me	H	OMe	CONHC(CH ₃) ₃	Ms	H
	Me	H	OMe	CONHC(CH ₃) ₃	Cl	H
	Me	H	OMe	CONHC ₄ H ₉	Ms	H
	Me	H	OMe	CONHC ₄ H ₉	Cl	H
35	Me	H	OMe	CONHCH ₂ CH(CH ₃) ₂	Ms	H
	Me	H	OMe	CONHCH ₂ CH(CH ₃) ₂	Cl	H
	Me	H	OMe	CONHCH(CH ₃)C ₂ H ₅	Ms	H
	Me	H	OMe	CONHCH(CH ₃)C ₂ H ₅	Cl	H
40	Me	H	OMe	CONEt ₂	Ms	H
	Me	H	OMe	CONEt ₂	Cl	H
	Me	H	OMe	CON(CH(CH ₃) ₂) ₂	Ms	H
	Me	H	OMe	CON(CH(CH ₃) ₂) ₂	Cl	H
	Me	H	OMe	Y1	Ms	H
45	Me	H	OMe	Y1	Cl	H
	Me	H	OMe	Y2	Ms	H
	Me	H	OMe	Y2	Cl	H
	Me	H	OMe	Y3	Ms	H
50						
55						

	A	B	X	Y	Z	Q
5	Me	H	OMe	Y3	Cl	H
	Me	H	OMe	COOPh	Ms	H
	Me	H	OMe	COOPh	Cl	H
	Me	H	OMe	COOCH ₂ Ph	Ms	H
10	Me	H	OMe	COOCH ₂ Ph	Cl	H
	Me	H	OMe	COOCH ₂ CH=CH ₂	Ms	H
	Me	H	OMe	COOCH ₂ CH=CH ₂	Cl	H
	Me	H	OMe	COOCH ₂ C≡CH	Ms	H
	Me	H	OMe	COOCH ₂ C≡CH	Cl	H
15	Me	H	OMe	C(O)SMe	Ms	H
	Me	H	OMe	C(O)SMe	Cl	H
	Me	H	OMe	C(O)SEt	Ms	H
	Me	H	OMe	C(O)SEt	Cl	H
20	Me	H	OMe	C(O)SCH(CH ₃) ₂	Ms	H
	Me	H	OMe	C(O)SCH(CH ₃) ₂	Cl	H
	Me	H	OMe	C(O)SC ₃ H ₇	Ms	H
	Me	H	OMe	C(O)SC ₃ H ₇	Cl	H
	Me	H	OMe	C(S)OMe	Ms	H
25	Me	H	OMe	C(S)OMe	Cl	H
	Me	H	OMe	C(S)OEt	Ms	H
	Me	H	OMe	C(S)OEt	Cl	H
	Me	H	OMe	C(S)OCH(CH ₃) ₂	Ms	H
	Me	H	OMe	C(S)OCH(CH ₃) ₂	Cl	H
30	Me	H	OMe	C(S)SC ₃ H ₇	Ms	H
	Me	H	OMe	C(S)SC ₃ H ₇	Cl	H
	Me	H	OMe	C(S)SMe	Ms	H
	Me	H	OMe	C(S)SMe	Cl	H
35	Me	H	OMe	C(S)SEt	Ms	H
	Me	H	OMe	C(S)SEt	Cl	H
	Me	H	OMe	C(S)SCH(CH ₃) ₂	Ms	H
	Me	H	OMe	C(S)SCH(CH ₃) ₂	Cl	H
	Me	H	OMe	C(S)SC ₃ H ₇	Ms	H
40	Me	H	OMe	C(S)SC ₃ H ₇	Cl	H
	Me	H	Br	COOMe	Ms	H
	Me	H	Br	COOMe	Cl	H
	Me	H	Br	COOEt	Ms	H
	Me	H	Br	COOEt	Cl	H
45	Me	H	Br	COOCH(CH ₃) ₂	Ms	H
	Me	H	Br	COOCH(CH ₃) ₂	Cl	H
	Me	H	Br	CON(CH ₃) ₂	Ms	H

50

55

	A	B	X	Y	Z	Q
5	Me	H	Br	CON(CH ₃) ₂	Cl	H
	Me	H	Br	CONHMe	Ms	H
	Me	H	Br	CONHEt	Ms	H
	Me	H	Br	CONHC ₃ H ₇	Ms	H
10	Me	H	Br	CONHCH(CH ₃) ₂	Ms	H
	Me	H	Br	CONHC(CH ₃) ₃	Ms	H
	Me	H	Br	CONEt ₂	Ms	H
	Me	H	Br	CONHC(CH ₃) ₃	Ms	H
15	Me	H	Br	CONHC ₄ H ₉	Ms	H
	Me	H	Br	CONHC ₄ H ₉	Ms	H
	Me	H	Br	CON(CH(CH ₃) ₂) ₂	Ms	H
	Me	H	Br	Y1	Ms	H
	Me	H	Br	Y2	Ms	H
20	Me	H	Br	COOPh	Ms	H
	Me	H	Br	COOCH ₂ Ph	Ms	H
	Me	H	Br	COOCH ₂ CH=CH ₂	Ms	H
	Me	H	Br	COOCH ₂ C≡CH	Ms	H
25	Me	H	OEt	COOMe	Ms	H
	Me	H	OEt	COOMe	Cl	H
	Me	H	OEt	COOEt	Ms	H
	Me	H	OEt	COOEt	Cl	H
	Me	H	OEt	COOCH(CH ₃) ₂	Ms	H
30	Me	H	OEt	COOCH(CH ₃) ₂	Cl	H
	Me	H	OEt	CON(CH ₃) ₂	Ms	H
	Me	H	OEt	CON(CH ₃) ₂	Cl	H
	Me	H	OEt	CONHMe	Ms	H
	Me	H	OEt	CONHEt	Ms	H
35	Me	H	OEt	CONHC ₃ H ₇	Ms	H
	Me	H	OEt	CONHCH(CH ₃) ₂	Ms	H
	Me	H	OEt	CONHC(CH ₃) ₃	Ms	H
	Me	H	OEt	CONEt ₂	Ms	H
40	Me	H	OEt	CONHC(CH ₃) ₃	Ms	H
	Me	H	OEt	CONHC ₄ H ₉	Ms	H
	Me	H	OEt	CONHC ₄ H ₉	Ms	H
	Me	H	OEt	CON(CH(CH ₃) ₂) ₂	Ms	H
	Me	H	OEt	Y1	Ms	H
45	Me	H	OEt	Y2	Ms	H
	Me	H	OEt	COOPh	Ms	H
	Me	H	OEt	COOCH ₂ Ph	Ms	H
	Me	H	OEt	COOCH ₂ CH=CH ₂	Ms	H
50						
55						

	A	B	X	Y	Z	Q
5	Me	H	OE ⁺	COOCH ₂ C≡CH	Ms	H
	Me	H	OCH(CH ₃) ₂	COOMe	Ms	H
	Me	H	OCH(CH ₃) ₂	COOMe	Cl	H
	Me	H	OCH(CH ₃) ₂	COOE ⁺	Ms	H
10	Me	H	OCH(CH ₃) ₂	COOE ⁺	Cl	H
	Me	H	OCH(CH ₃) ₂	COOCH(CH ₃) ₂	Ms	H
	Me	H	OCH(CH ₃) ₂	COOCH(CH ₃) ₂	Cl	H
	Me	H	OCH(CH ₃) ₂	CON(CH ₃) ₂	Ms	H
15	Me	H	OCH(CH ₃) ₂	CON(CH ₃) ₂	Cl	H
	Me	H	OCH(CH ₃) ₂	CONHMe	Ms	H
	Me	H	OCH(CH ₃) ₂	CONHE ⁺	Ms	H
	Me	H	OCH(CH ₃) ₂	CONHC ₃ H ₇	Ms	H
	Me	H	OCH(CH ₃) ₂	CONHCH(CH ₃) ₂	Ms	H
20	Me	H	OCH(CH ₃) ₂	CONHC(CH ₃) ₃	Ms	H
	Me	H	OCH(CH ₃) ₂	CONEt ₂	Ms	H
	Me	H	OCH(CH ₃) ₂	CONHC(CH ₃) ₃	Ms	H
	Me	H	OCH(CH ₃) ₂	CONHC ₄ H ₉	Ms	H
25	Me	H	OCH(CH ₃) ₂	CONHC ₄ H ₉	Ms	H
	Me	H	OCH(CH ₃) ₂	CON(CH(CH ₃) ₂) ₂	Ms	H
	Me	H	OCH(CH ₃) ₂	Y1	Ms	H
	Me	H	OCH(CH ₃) ₂	Y2	Ms	H
	Me	H	OCH(CH ₃) ₂	COOPh	Ms	H
30	Me	H	OCH(CH ₃) ₂	COOCH ₂ Ph	Ms	H
	Me	H	OCH(CH ₃) ₂	COOCH ₂ CH=CH ₂	Ms	H
	Me	H	OCH(CH ₃) ₂	COOCH ₂ C≡CH	Ms	H
	Me	H	CH ₂ OCH ₃	COOMe	Ms	H
	Me	H	CH ₂ OCH ₃	COOMe	Cl	H
35	Me	H	CH ₂ OCH ₃	COOE ⁺	Ms	H
	Me	H	CH ₂ OCH ₃	COOE ⁺	Cl	H
	Me	H	CH ₂ OCH ₃	COOCH(CH ₃) ₂	Ms	H
	Me	H	CH ₂ OCH ₃	COOCH(CH ₃) ₂	Cl	H
40	Me	H	CH ₂ OCH ₃	CON(CH ₃) ₂	Ms	H
	Me	H	CH ₂ OCH ₃	CON(CH ₃) ₂	Cl	H
	Me	H	CH ₂ OCH ₃	CONHMe	Ms	H
	Me	H	CH ₂ OCH ₃	CONHE ⁺	Ms	H
	Me	H	CH ₂ OCH ₃	CONHC ₃ H ₇	Ms	H
45	Me	H	CH ₂ OCH ₃	CONHCH(CH ₃) ₂	Ms	H
	Me	H	CH ₂ OCH ₃	CONHC(CH ₃) ₃	Ms	H
	Me	H	CH ₂ OCH ₃	CONEt ₂	Ms	H
	Me	H	CH ₂ OCH ₃	CONHC(CH ₃) ₃	Ms	H

50

55

	A	B	X	Y	Z	Q
5	Me	H	CH ₂ OCH ₃	CONHC ₂ H ₅	Ms	H
	Me	H	CH ₂ OCH ₃	CONHC ₂ H ₅	Ms	H
	Me	H	CH ₂ OCH ₃	CON (CH(CH ₃) ₂) ₂	Ms	H
	Me	H	CH ₂ OCH ₃	Y1	Ms	H
10	Me	H	CH ₂ OCH ₃	Y2	Ms	H
	Me	H	CH ₂ OCH ₃	COOPh	Ms	H
	Me	H	CH ₂ OCH ₃	COOCH ₂ Ph	Ms	H
	Me	H	CH ₂ OCH ₃	COOCH ₂ CH=CH ₂	Ms	H
	Me	H	CH ₂ OCH ₃	COOCH ₂ C≡CH	Ms	H
15	Et	H	Cl	COOMe	MeS	H
	Et	H	Cl	COOMe	MeSO	H
	Et	H	Cl	COOMe	Ms	H
	Et	H	Cl	COOMe	Ms	Q1

20

25

30

35

40

45

50

55

	A	B	X	Y	Z	Q
5	Et	H	Cl	COOMe	Ms	Q2
	Et	H	Cl	COOMe	Ms	Q3
	Et	H	Cl	COOMe	Ms	Q4
	Et	H	Cl	COOMe	Ms	Q5
10	Et	H	Cl	COOMe	Ms	Q6
	Et	H	Cl	COOMe	Ms	Q20
	Et	Me	Cl	COOMe	Ms	H
	Et	Cl	Cl	COOMe	Ms	H
	Et	CF ₃	Cl	COOMe	Ms	H
15	Et	OMe	Cl	COOMe	Ms	H
	Et	SMe	Cl	COOMe	Ms	H
	Et	H	Cl	COOEt	MeS	H
	Et	H	Cl	COOEt	MeSO	H
20	Et	H	Cl	COOEt	Ms	H
	Et	H	Cl	COOEt	Ms	Q1
	Et	H	Cl	COOEt	Ms	Q18
	Et	H	Cl	COOEt	Ms	Q13
	Et	H	Cl	COOEt	Ms	Q4
25	Et	H	Cl	COOEt	Ms	Q5
	Et	H	Cl	COOEt	Ms	Q6
	Et	H	Cl	COOEt	Ms	Q22
	Et	Me	Cl	COOEt	Ms	H
	Et	Cl	Cl	COOEt	Ms	H
30	Et	CF ₃	Cl	COOEt	Ms	H
	Et	OMe	Cl	COOEt	Ms	H
	Et	SMe	Cl	COOEt	Ms	H
	Et	H	Cl	COOCH(CH ₃) ₂	MeS	H
35	Et	H	Cl	COOCH(CH ₃) ₂	MeSO	H
	Et	H	Cl	COOCH(CH ₃) ₂	Ms	H
	Et	H	Cl	COOCH(CH ₃) ₂	Ms	Q7
	Et	H	Cl	COOCH(CH ₃) ₂	Ms	Q12
	Et	H	Cl	COOCH(CH ₃) ₂	Ms	Q9
40	Et	H	Cl	COOCH(CH ₃) ₂	Ms	Q4
	Et	H	Cl	COOCH(CH ₃) ₂	Ms	Q5
	Et	H	Cl	COOCH(CH ₃) ₂	Ms	Q6
	Et	H	Cl	COOCH(CH ₃) ₂	Ms	Q17
	Et	Me	Cl	COOCH(CH ₃) ₂	Ms	H
45	Et	Cl	Cl	COOCH(CH ₃) ₂	Ms	H
	Et	CF ₃	Cl	COOCH(CH ₃) ₂	Ms	H
	Et	OMe	Cl	COOCH(CH ₃) ₂	Ms	H

50

55

	A	B	X	Y	Z	Q
5	Et	SMe	Cl	COOCH(CH ₃) ₂	Ms	H
	Et	H	Cl	COOMe	Cl	H
	Et	H	Cl	COOMe	Cl	Q1
	Et	H	Cl	COOMe	Cl	Q2
10	Et	H	Cl	COOMe	Cl	Q3
	Et	H	Cl	COOEt	Cl	H
	Et	H	Cl	COOEt	Cl	Q1
	Et	H	Cl	COOEt	Cl	Q2
	Et	H	Cl	COOEt	Cl	Q3
15	Et	H	Cl	COOCH(CH ₃) ₂	Cl	H
	Et	H	Cl	COOCH(CH ₃) ₂	Cl	Q1
	Et	H	Cl	COOCH(CH ₃) ₂	Cl	Q2
	Et	H	Cl	COOCH(CH ₃) ₂	Cl	Q3
20	Et	H	Cl	CON(CH ₃) ₂	MeS	H
	Et	H	Cl	CON(CH ₃) ₂	MeSO	H
	Et	H	Cl	CON(CH ₃) ₂	Ms	H
	Et	H	Cl	CON(CH ₃) ₂	Ms	Q1
25	Et	H	Cl	CON(CH ₃) ₂	Ms	Q18
	Et	H	Cl	CON(CH ₃) ₂	Ms	Q13
	Et	H	Cl	CON(CH ₃) ₂	Ms	Q4
	Et	H	Cl	CON(CH ₃) ₂	Ms	Q5
	Et	H	Cl	CON(CH ₃) ₂	Ms	Q6
30	Et	H	Cl	CON(CH ₃) ₂	Ms	Q22
	Et	Me	Cl	CON(CH ₃) ₂	Ms	H
	Et	Cl	Cl	CON(CH ₃) ₂	Ms	H
	Et	CF ₃	Cl	CON(CH ₃) ₂	Ms	H
	Et	OMe	Cl	CON(CH ₃) ₂	Ms	H
35	Et	SMe	Cl	CON(CH ₃) ₂	Ms	H
	Et	H	Cl	CON(CH ₃) ₂	Cl	H
	Et	H	Cl	CON(CH ₃) ₂	Cl	Q1
	Et	H	Cl	CON(CH ₃) ₂	Cl	Q2
	Et	H	Cl	CON(CH ₃) ₂	Cl	Q3
40	Et	H	Cl	COOC ₄ H ₉	Ms	H
	Et	H	Cl	COOC ₄ H ₉	Cl	H
	Et	H	Cl	COOCH ₂ CH(CH ₃) ₂	Ms	H
	Et	H	Cl	COOCH ₂ CH(CH ₃) ₂	Cl	H
45	Et	H	Cl	COOCH(CH ₃)C ₂ H ₅	Ms	H
	Et	H	Cl	COOCH(CH ₃)C ₂ H ₅	Cl	H
	Et	H	Cl	COOC(CH ₃) ₃	Ms	H
	Et	H	Cl	COOC(CH ₃) ₃	Cl	H
50						
55						

	A	B	X	Y	Z	Q
5	Et	H	Cl	CONHMe	Ms	H
	Et	H	Cl	CONHMe	Cl	H
	Et	H	Cl	CONHEt	Ms	H
10	Et	H	Cl	CONHEt	Cl	H
	Et	H	Cl	CONHCH(CH ₃) ₂	Ms	H
	Et	H	Cl	CONHCH(CH ₃) ₂	Cl	H
	Et	H	Cl	CONHC(CH ₃) ₃	Ms	H
	Et	H	Cl	CONHC(CH ₃) ₃	Cl	H
15	Et	H	Cl	CONHC ₄ H ₉	Ms	H
	Et	H	Cl	CONHC ₄ H ₉	Cl	H
	Et	H	Cl	CONHCH ₂ CH(CH ₃) ₂	Ms	H
	Et	H	Cl	CONHCH ₂ CH(CH ₃) ₂	Cl	H
20	Et	H	Cl	CONHCH(CH ₃)C ₂ H ₅	Ms	H
	Et	H	Cl	CONHCH(CH ₃)C ₂ H ₅	Cl	H
	Et	H	Cl	CONEt ₂	Ms	H
	Et	H	Cl	CONEt ₂	Cl	H
25	Et	H	Cl	CON(CH(CH ₃) ₂) ₂	Ms	H
	Et	H	Cl	CON(CH(CH ₃) ₂) ₂	Cl	H
	Et	H	Cl	Y1	Ms	H
	Et	H	Cl	Y1	Cl	H
	Et	H	Cl	Y2	Ms	H
30	Et	H	Cl	Y2	Cl	H
	Et	H	Cl	Y3	Ms	H
	Et	H	Cl	Y3	Cl	H
	Et	H	Cl	COOPh	Ms	H
	Et	H	Cl	COOPh	Cl	H
35	Et	H	Cl	COOCH ₂ Ph	Ms	H
	Et	H	Cl	COOCH ₂ Ph	Cl	H
	Et	H	Cl	COOCH ₂ CH=CH ₂	Ms	H
	Et	H	Cl	COOCH ₂ CH=CH ₂	Cl	H
40	Et	H	Cl	COOCH ₂ C≡CH	Ms	H
	Et	H	Cl	COOCH ₂ C≡CH	Cl	H
	Et	H	Cl	C(O)SMe	Ms	H
	Et	H	Cl	C(O)SMe	Cl	H
	Et	H	Cl	C(O)SEt	Ms	H
	Et	H	Cl	C(O)SEt	Cl	H
45	Et	H	Cl	C(O)SCH(CH ₃) ₂	Ms	H
	Et	H	Cl	C(O)SCH(CH ₃) ₂	Cl	H
	Et	H	Cl	C(O)SC ₃ H ₇	Ms	H
	Et	H	Cl	C(O)SC ₃ H ₇	Cl	H
50						
55						

	A	B	X	Y	Z	Q
5	Et	H	Cl	C(S)OMe	Ms	H
	Et	H	Cl	C(S)OMe	Cl	H
	Et	H	Cl	C(S)OEt	Ms	H
10	Et	H	Cl	C(S)OEt	Cl	H
	Et	H	Cl	C(S)OCH(CH ₃) ₂	Ms	H
	Et	H	Cl	C(S)OCH(CH ₃) ₂	Cl	H
	Et	H	Cl	C(S)SC ₃ H ₇	Ms	H
	Et	H	Cl	C(S)SC ₃ H ₇	Cl	H
15	Et	H	Cl	C(S)SMe	Ms	H
	Et	H	Cl	C(S)SMe	Cl	H
	Et	H	Cl	C(S)SEt	Ms	H
	Et	H	Cl	C(S)SEt	Cl	H
20	Et	H	Cl	C(S)SCH(CH ₃) ₂	Ms	H
	Et	H	Cl	C(S)SCH(CH ₃) ₂	Cl	H
	Et	H	Cl	C(S)SC ₃ H ₇	Ms	H
	Et	H	Cl	C(S)SC ₃ H ₇	Cl	H
	Et	H	Me	COOMe	MeS	H
25	Et	H	Me	COOMe	MeSO	H
	Et	H	Me	COOMe	Ms	H
	Et	H	Me	COOMe	Ms	Q1
	Et	H	Me	COOMe	Ms	Q2
	Et	H	Me	COOMe	Ms	Q3
30	Et	H	Me	COOMe	Ms	Q4
	Et	H	Me	COOMe	Ms	Q5
	Et	H	Me	COOMe	Ms	Q6
	Et	H	Me	COOMe	Ms	Q20
	Et	Me	Me	COOMe	Ms	H
35	Et	Cl	Me	COOMe	Ms	H
	Et	CF ₃	Me	COOMe	Ms	H
	Et	OMe	Me	COOMe	Ms	H
	Et	SMe	Me	COOMe	Ms	H
40	Et	H	Me	COOEt	MeS	H
	Et	H	Me	COOEt	MeSO	H
	Et	H	Me	COOEt	Ms	H
	Et	H	Me	COOEt	Ms	Q1
	Et	H	Me	COOEt	Ms	Q18
45	Et	H	Me	COOEt	Ms	Q13
	Et	H	Me	COOEt	Ms	Q4
	Et	H	Me	COOEt	Ms	Q5
	Et	H	Me	COOEt	Ms	Q6
50						
55						

	A	B	X	Y	Z	Q
5	Et	H	Me	COOEt	Ms	Q22
	Et	Me	Me	COOEt	Ms	H
	Et	Cl	Me	COOEt	Ms	H
	Et	CF ₃	Me	COOEt	Ms	H
10	Et	OMe	Me	COOEt	Ms	H
	Et	SMe	Me	COOEt	Ms	H
	Et	H	Me	COOCH(CH ₃) ₂	MeS	H
	Et	H	Me	COOCH(CH ₃) ₂	MeSO	H
	Et	H	Me	COOCH(CH ₃) ₂	Ms	H
15	Et	H	Me	COOCH(CH ₃) ₂	Ms	Q7
	Et	H	Me	COOCH(CH ₃) ₂	Ms	Q12
	Et	H	Me	COOCH(CH ₃) ₂	Ms	Q9
	Et	H	Me	COOCH(CH ₃) ₂	Ms	Q4
20	Et	H	Me	COOCH(CH ₃) ₂	Ms	Q5
	Et	H	Me	COOCH(CH ₃) ₂	Ms	Q6
	Et	H	Me	COOCH(CH ₃) ₂	Ms	Q17
	Et	Me	Me	COOCH(CH ₃) ₂	Ms	H
	Et	Cl	Me	COOCH(CH ₃) ₂	Ms	H
25	Et	CF ₃	Me	COOCH(CH ₃) ₂	Ms	H
	Et	OMe	Me	COOCH(CH ₃) ₂	Ms	H
	Et	SMe	Me	COOCH(CH ₃) ₂	Ms	H
	Et	H	Me	COOMe	Cl	H
30	Et	H	Me	COOMe	Cl	Q1
	Et	H	Me	COOMe	Cl	Q2
	Et	H	Me	COOMe	Cl	Q3
	Et	H	Me	COOEt	Cl	H
	Et	H	Me	COOEt	Cl	Q1
35	Et	H	Me	COOEt	Cl	Q2
	Et	H	Me	COOEt	Cl	Q3
	Et	H	Me	COOCH(CH ₃) ₂	Cl	H
	Et	H	Me	COOCH(CH ₃) ₂	Cl	Q1
	Et	H	Me	COOCH(CH ₃) ₂	Cl	Q2
40	Et	H	Me	COOCH(CH ₃) ₂	Cl	Q3
	Et	H	Me	CON(CH ₃) ₂	MeS	H
	Et	H	Me	CON(CH ₃) ₂	MeSO	H
	Et	H	Me	CON(CH ₃) ₂	Ms	H
45	Et	H	Me	CON(CH ₃) ₂	Ms	Q1
	Et	H	Me	CON(CH ₃) ₂	Ms	Q18
	Et	H	Me	CON(CH ₃) ₂	Ms	Q13
	Et	H	Me	CON(CH ₃) ₂	Ms	Q4

50

55

	A	B	X	Y	Z	Q
5	Et	H	Me	CON(CH ₃) ₂	Ms	Q5
	Et	H	Me	CON(CH ₃) ₂	Ms	Q6
	Et	H	Me	CON(CH ₃) ₂	Ms	Q22
	Et	Me	Me	CON(CH ₃) ₂	Ms	H
10	Et	Cl	Me	CON(CH ₃) ₂	Ms	H
	Et	CF ₃	Me	CON(CH ₃) ₂	Ms	H
	Et	OMe	Me	CON(CH ₃) ₂	Ms	H
	Et	SMe	Me	CON(CH ₃) ₂	Ms	H
15	Et	H	Me	CON(CH ₃) ₂	Cl	H
	Et	H	Me	CON(CH ₃) ₂	Cl	Q1
	Et	H	Me	CON(CH ₃) ₂	Cl	Q2
	Et	H	Me	CON(CH ₃) ₂	Cl	Q3
	Et	H	Me	COOC ₄ H ₉	Ms	H
20	Et	H	Me	COOC ₄ H ₉	Cl	H
	Et	H	Me	COOCH ₂ CH(CH ₃) ₂	Ms	H
	Et	H	Me	COOCH ₂ CH(CH ₃) ₂	Cl	H
	Et	H	Me	COOCH(CH ₃)C ₂ H ₅	Ms	H
	Et	H	Me	COOCH(CH ₃)C ₂ H ₅	Cl	H
25	Et	H	Me	COOC(CH ₃) ₃	Ms	H
	Et	H	Me	COOC(CH ₃) ₃	Cl	H
	Et	H	Me	CONHMe	Ms	H
	Et	H	Me	CONHMe	Cl	H
30	Et	H	Me	CONHEt	Ms	H
	Et	H	Me	CONHEt	Cl	H
	Et	H	Me	CONHCH(CH ₃) ₂	Ms	H
	Et	H	Me	CONHCH(CH ₃) ₂	Cl	H
	Et	H	Me	CONHC(CH ₃) ₃	Ms	H
35	Et	H	Me	CONHC(CH ₃) ₃	Cl	H
	Et	H	Me	CONHC ₄ H ₉	Ms	H
	Et	H	Me	CONHC ₄ H ₉	Cl	H
	Et	H	Me	CONHCH ₂ CH(CH ₃) ₂	Ms	H
40	Et	H	Me	CONHCH ₂ CH(CH ₃) ₂	Cl	H
	Et	H	Me	CONHCH(CH ₃)C ₂ H ₅	Ms	H
	Et	H	Me	CONHCH(CH ₃)C ₂ H ₅	Cl	H
	Et	H	Me	CONEt ₂	Ms	H
	Et	H	Me	CONEt ₂	Cl	H
45	Et	H	Me	CON(CH(CH ₃) ₂) ₂	Ms	H
	Et	H	Me	CON(CH(CH ₃) ₂) ₂	Cl	H
	Et	H	Me	Yl	Ms	H
	Et	H	Me	Yl	Cl	H
50						
55						

	A	B	X	Y	Z	Q
5	Et	H	Me	Y2	Ms	H
	Et	H	Me	Y2	Cl	H
	Et	H	Me	Y3	Ms	H
	Et	H	Me	Y3	Cl	H
10	Et	H	Me	COOPh	Ms	H
	Et	H	Me	COOPh	Cl	H
	Et	H	Me	COOCH ₂ Ph	Ms	H
	Et	H	Me	COOCH ₂ Ph	Cl	H
	Et	H	Me	COOCH ₂ CH=CH ₂	Ms	H
15	Et	H	Me	COOCH ₂ CH=CH ₂	Cl	H
	Et	H	Me	COOCH ₂ C≡CH	Ms	H
	Et	H	Me	COOCH ₂ C≡CH	Cl	H
	Et	H	Me	C(O)SMe	Ms	H
20	Et	H	Me	C(O)SMe	Cl	H
	Et	H	Me	C(O)SEt	Ms	H
	Et	H	Me	C(O)SEt	Cl	H
	Et	H	Me	C(O)SCH(CH ₃) ₂	Ms	H
	Et	H	Me	C(O)SCH(CH ₃) ₂	Cl	H
25	Et	H	Me	C(O)SC ₃ H ₇	Ms	H
	Et	H	Me	C(O)SC ₃ H ₇	Cl	H
	Et	H	Me	C(S)OMe	Ms	H
	Et	H	Me	C(S)OMe	Cl	H
30	Et	H	Me	C(S)OEt	Ms	H
	Et	H	Me	C(S)OEt	Cl	H
	Et	H	Me	C(S)OCH(CH ₃) ₂	Ms	H
	Et	H	Me	C(S)OCH(CH ₃) ₂	Cl	H
	Et	H	Me	C(S)SC ₃ H ₇	Ms	H
35	Et	H	Me	C(S)SC ₃ H ₇	Cl	H
	Et	H	Me	C(S)SMe	Ms	H
	Et	H	Me	C(S)SMe	Cl	H
	Et	H	Me	C(S)SEt	Ms	H
	Et	H	Me	C(S)SEt	Cl	H
40	Et	H	Me	C(S)SCH(CH ₃) ₂	Ms	H
	Et	H	Me	C(S)SCH(CH ₃) ₂	Cl	H
	Et	H	Me	C(S)SC ₃ H ₇	Ms	H
	Et	H	Me	C(S)SC ₃ H ₇	Cl	H
45	Et	H	OMe	COOMe	MeS	H
	Et	H	OMe	COOMe	MeSO	H
	Et	H	OMe	COOMe	Ms	H
	Et	H	OMe	COOMe	Ms	Q1
50						
55						

	A	E	X	Y	Z	Q
5	Et	H	OMe	COOMe	Ms	Q2
	Et	H	OMe	COOMe	Ms	Q3
	Et	H	OMe	COOMe	Ms	Q4
	Et	H	OMe	COOMe	Ms	Q5
10	Et	H	OMe	COOMe	Ms	Q6
	Et	H	OMe	COOMe	Ms	Q20
	Et	Me	OMe	COOMe	Ms	H
	Et	Cl	OMe	COOMe	Ms	H
15	Et	CF ₃	OMe	COOMe	Ms	H
	Et	OMe	OMe	COOMe	Ms	H
	Et	SMe	OMe	COOMe	Ms	H
	Et	H	OMe	COOEt	MeS	H
	Et	H	OMe	COOEt	MeSO	H
20	Et	H	OMe	COOEt	Ms	H
	Et	H	OMe	COOEt	Ms	Q1
	Et	H	OMe	COOEt	Ms	Q18
	Et	H	OMe	COOEt	Ms	Q13
25	Et	H	OMe	COOEt	Ms	Q4
	Et	H	OMe	COOEt	Ms	Q5
	Et	H	OMe	COOEt	Ms	Q6
	Et	H	OMe	COOEt	Ms	Q22
	Et	Me	OMe	COOEt	Ms	H
30	Et	Cl	OMe	COOEt	Ms	H
	Et	CF ₃	OMe	COOEt	Ms	H
	Et	OMe	OMe	COOEt	Ms	H
	Et	SMe	OMe	COOEt	Ms	H
35	Et	H	OMe	COOCH(CH ₃) ₂	MeS	H
	Et	H	OMe	COOCH(CH ₃) ₂	MeSO	H
	Et	H	OMe	COOCH(CH ₃) ₂	Ms	H
	Et	H	OMe	COOCH(CH ₃) ₂	Ms	Q7
	Et	H	OMe	COOCH(CH ₃) ₂	Ms	Q12
40	Et	H	OMe	COOCH(CH ₃) ₂	Ms	Q9
	Et	H	OMe	COOCH(CH ₃) ₂	Ms	Q4
	Et	H	OMe	COOCH(CH ₃) ₂	Ms	Q5
	Et	H	OMe	COOCH(CH ₃) ₂	Ms	Q6
	Et	H	OMe	COOCH(CH ₃) ₂	Ms	Q17
45	Et	Me	OMe	COOCH(CH ₃) ₂	Ms	H
	Et	Cl	OMe	COOCH(CH ₃) ₂	Ms	H
	Et	CF ₃	OMe	COOCH(CH ₃) ₂	Ms	H
	Et	OMe	OMe	COOCH(CH ₃) ₂	Ms	H
50						
55						

	A	B	X	Y	Z	Q
5	Et	SMe	OMe	COOCH(CH ₃) ₂	Ms	H
	Et	H	OMe	COOMe	Cl	H
	Et	H	OMe	COOMe	Cl	Q1
	Et	H	OMe	COOMe	Cl	Q2
10	Et	H	OMe	COOMe	Cl	Q3
	Et	H	OMe	COOEt	Cl	H
	Et	H	OMe	COOEt	Cl	Q1
	Et	H	OMe	COOEt	Cl	Q2
	Et	H	OMe	COOEt	Cl	Q3
15	Et	H	OMe	COOCH(CH ₃) ₂	Cl	H
	Et	H	OMe	COOCH(CH ₃) ₂	Cl	Q1
	Et	H	OMe	COOCH(CH ₃) ₂	Cl	Q2
	Et	H	OMe	COOCH(CH ₃) ₂	Cl	Q3
20	Et	H	OMe	CON(CH ₃) ₂	MeS	H
	Et	H	OMe	CON(CH ₃) ₂	MeSO	H
	Et	H	OMe	CON(CH ₃) ₂	Ms	H
	Et	H	OMe	CON(CH ₃) ₂	Ms	Q1
	Et	H	OMe	CON(CH ₃) ₂	Ms	Q18
25	Et	H	OMe	CON(CH ₃) ₂	Ms	Q13
	Et	H	OMe	CON(CH ₃) ₂	Ms	Q4
	Et	H	OMe	CON(CH ₃) ₂	Ms	Q5
	Et	H	OMe	CON(CH ₃) ₂	Ms	Q6
	Et	H	OMe	CON(CH ₃) ₂	Ms	Q22
30	Et	Me	OMe	CON(CH ₃) ₂	Ms	H
	Et	Cl	OMe	CON(CH ₃) ₂	Ms	H
	Et	CF ₃	OMe	CON(CH ₃) ₂	Ms	H
	Et	OMe	OMe	CON(CH ₃) ₂	Ms	H
35	Et	SMe	OMe	CON(CH ₃) ₂	Ms	H
	Et	H	OMe	CON(CH ₃) ₂	Cl	H
	Et	H	OMe	CON(CH ₃) ₂	Cl	Q1
	Et	H	OMe	CON(CH ₃) ₂	Cl	Q2
	Et	H	OMe	CON(CH ₃) ₂	Cl	Q3
40	Et	H	OMe	COOC ₄ H ₉	Ms	H
	Et	H	OMe	COOC ₄ H ₉	Cl	H
	Et	H	OMe	COOCH ₂ CH(CH ₃) ₂	Ms	H
	Et	H	OMe	COOCH ₂ CH(CH ₃) ₂	Cl	H
45	Et	H	OMe	COOCH(CH ₃)C ₂ H ₅	Ms	H
	Et	H	OMe	COOCH(CH ₃)C ₂ H ₅	Cl	H
	Et	H	OMe	COOC(CH ₃) ₃	Ms	H
	Et	H	OMe	COOC(CH ₃) ₃	Cl	H

50

55

	A	B	X	Y	Z	Q
5	Et	H	OMe	CONHMe	Ms	H
	Et	H	OMe	CONHMe	Cl	H
	Et	H	OMe	CONHEt	Ms	H
	Et	H	OMe	CONHEt	Cl	H
10	Et	H	OMe	CONHCH(CH ₃) ₂	Ms	H
	Et	H	OMe	CONHCH(CH ₃) ₂	Cl	H
	Et	H	OMe	CONHC(CH ₃) ₃	Ms	H
	Et	H	OMe	CONHC(CH ₃) ₃	Cl	H
15	Et	H	OMe	CONHC ₄ H ₉	Ms	H
	Et	H	OMe	CONHC ₄ H ₉	Cl	H
	Et	H	OMe	CONHCH ₂ CH(CH ₃) ₂	Ms	H
	Et	H	OMe	CONHCH ₂ CH(CH ₃) ₂	Cl	H
	Et	H	OMe	CONHCH(CH ₃)C ₂ H ₅	Ms	H
20	Et	H	OMe	CONHCH(CH ₃)C ₂ H ₅	Cl	H
	Et	H	OMe	CONEt ₂	Ms	H
	Et	H	OMe	CONEt ₂	Cl	H
	Et	H	OMe	CON(CH(CH ₃) ₂) ₂	Ms	H
	Et	H	OMe	CON(CH(CH ₃) ₂) ₂	Cl	H
25	Et	H	OMe	Y1	Ms	H
	Et	H	OMe	Y1	Cl	H
	Et	H	OMe	Y2	Ms	H
	Et	H	OMe	Y2	Cl	H
30	Et	H	OMe	Y3	Ms	H
	Et	H	OMe	Y3	Cl	H
	Et	H	OMe	COOPh	Ms	H
	Et	H	OMe	COOPh	Cl	H
	Et	H	OMe	COOCH ₂ Ph	Ms	H
35	Et	H	OMe	COOCH ₂ Ph	Cl	H
	Et	H	OMe	COOCH ₂ CH=CH ₂	Ms	H
	Et	H	OMe	COOCH ₂ CH=CH ₂	Cl	H
	Et	H	OMe	COOCH ₂ C≡CH	Ms	H
40	Et	H	OMe	COOCH ₂ C≡CH	Cl	H
	Et	H	OMe	C(O)SMe	Ms	H
	Et	H	OMe	C(O)SMe	Cl	H
	Et	H	OMe	C(O)SEt	Ms	H
	Et	H	OMe	C(O)SEt	Cl	H
45	Et	H	OMe	C(O)SCH(CH ₃) ₂	Ms	H
	Et	H	OMe	C(O)SCH(CH ₃) ₂	Cl	H
	Et	H	OMe	C(O)SC ₃ H ₇	Ms	H
	Et	H	OMe	C(O)SC ₃ H ₇	Cl	H
50						
55						

	A	B	X	Y	Z	Q
5	Et	H	OMe	C(S)OMe	Ms	H
	Et	H	OMe	C(S)OMe	Cl	H
	Et	H	OMe	C(S)OEt	Ms	H
	Et	H	OMe	C(S)OEt	Cl	H
10	Et	H	OMe	C(S)OCH(CH ₃) ₂	Ms	H
	Et	H	OMe	C(S)OCH(CH ₃) ₂	Cl	H
	Et	H	OMe	C(S)SC ₃ H ₇	Ms	H
	Et	H	OMe	C(S)SC ₃ H ₇	Cl	H
15	Et	H	OMe	C(S)SMe	Ms	H
	Et	H	OMe	C(S)SMe	Cl	H
	Et	H	OMe	C(S)SEt	Ms	H
	Et	H	OMe	C(S)SEt	Cl	H
	Et	H	OMe	C(S)SCH(CH ₃) ₂	Ms	H
20	Et	H	OMe	C(S)SCH(CH ₃) ₂	Cl	H
	Et	H	OMe	C(S)SC ₃ H ₇	Ms	H
	Et	H	OMe	C(S)SC ₃ H ₇	Cl	H
	Et	H	Br	COOMe	Ms	H
25	Et	H	Br	COOMe	Cl	H
	Et	H	Br	COOEt	Ms	H
	Et	H	Br	COOEt	Cl	H
	Et	H	Br	COOCH(CH ₃) ₂	Ms	H
	Et	H	Br	COOCH(CH ₃) ₂	Cl	H
30	Et	H	Br	CON(CH ₃) ₂	Ms	H
	Et	H	Br	CON(CH ₃) ₂	Cl	H
	Et	H	Br	CONHMe	Ms	H
	Et	H	Br	CONHEt	Ms	H
	Et	H	Br	CONHC ₃ H ₇	Ms	H
35	Et	H	Br	CONHCH(CH ₃) ₂	Ms	H
	Et	H	Br	CONHC(CH ₃) ₃	Ms	H
	Et	H	Br	CONEt ₂	Ms	H
	Et	H	Br	CONHC(CH ₃) ₃	Ms	H
40	Et	H	Br	CONHC ₄ H ₉	Ms	H
	Et	H	Br	CONHC ₄ H ₉	Ms	H
	Et	H	Br	CON(CH(CH ₃) ₂) ₂	Ms	H
	Et	H	Br	Y1	Ms	H
	Et	H	Br	Y2	Ms	H
45	Et	H	Br	COOPh	Ms	H
	Et	H	Br	COOCH ₂ Ph	Ms	H
	Et	H	Br	COOCH ₂ CH=CH ₂	Ms	H
	Et	H	Br	COOCH ₂ C≡CH	Ms	H

50

55

	A	B	X	Y	Z	Q
5	Et	H	OEt	COOMe	Ms	H
	Et	H	OEt	COOMe	Cl	H
	Et	H	OEt	COOEt	Ms	H
	Et	H	OEt	COOEt	Cl	H
10	Et	H	OEt	COOCH(CH ₃) ₂	Ms	H
	Et	H	OEt	COOCH(CH ₃) ₂	Cl	H
	Et	H	OEt	CON(CH ₃) ₂	Ms	H
	Et	H	OEt	CON(CH ₃) ₂	Cl	H
15	Et	H	OEt	CONHMe	Ms	H
	Et	H	OEt	CONHEt	Ms	H
	Et	H	OEt	CONHC ₃ H ₇	Ms	H
	Et	H	OEt	CONHCH(CH ₃) ₂	Ms	H
	Et	H	OEt	CONHC(CH ₃) ₃	Ms	H
20	Et	H	OEt	CONEt ₂	Ms	H
	Et	H	OEt	CONHC(CH ₃) ₃	Ms	H
	Et	H	OEt	CONHC ₄ H ₉	Ms	H
	Et	H	OEt	CONHC ₄ H ₉	Ms	H
	Et	H	OEt	CON(CH(CH ₃) ₂) ₂	Ms	H
25	Et	H	OEt	Y1	Ms	H
	Et	H	OEt	Y2	Ms	H
	Et	H	OEt	COOPh	Ms	H
	Et	H	OEt	COOCH ₂ Ph	Ms	H
30	Et	H	OEt	COOCH ₂ CH=CH ₂	Ms	H
	Et	H	OEt	COOCH ₂ C≡CH	Ms	H
	Et	H	OCH(CH ₃) ₂	COOMe	Ms	H
	Et	H	OCH(CH ₃) ₂	COOMe	Cl	H
	Et	H	OCH(CH ₃) ₂	COOEt	Ms	H
35	Et	H	OCH(CH ₃) ₂	COOEt	Cl	H
	Et	H	OCH(CH ₃) ₂	COOCH(CH ₃) ₂	Ms	H
	Et	H	OCH(CH ₃) ₂	COOCH(CH ₃) ₂	Cl	H
	Et	H	OCH(CH ₃) ₂	CON(CH ₃) ₂	Ms	H
	Et	H	OCH(CH ₃) ₂	CON(CH ₃) ₂	Cl	H
40	Et	H	OCH(CH ₃) ₂	CONHMe	Ms	H
	Et	H	OCH(CH ₃) ₂	CONHEt	Ms	H
	Et	H	OCH(CH ₃) ₂	CONHC ₃ H ₇	Ms	H
	Et	H	OCH(CH ₃) ₂	CONHCH(CH ₃) ₂	Ms	H
45	Et	H	OCH(CH ₃) ₂	CONHC(CH ₃) ₃	Ms	H
	Et	H	OCH(CH ₃) ₂	CONEt ₂	Ms	H
	Et	H	OCH(CH ₃) ₂	CONHC(CH ₃) ₃	Ms	H
	Et	H	OCH(CH ₃) ₂	CONHC ₄ H ₉	Ms	H

50

55

	A	B	X	Y	Z	Q
5	Et	H	OCH(CH ₃) ₂	CONHC ₄ H ₉	Ms	H
	Et	H	OCH(CH ₃) ₂	CON (CH(CH ₃) ₂) ₂	Ms	H
	Et	H	OCH(CH ₃) ₂	Y1	Ms	H
	Et	H	OCH(CH ₃) ₂	Y2	Ms	H
10	Et	H	OCH(CH ₃) ₂	COOPh	Ms	H
	Et	H	OCH(CH ₃) ₂	COOCH ₂ Ph	Ms	H
	Et	H	OCH(CH ₃) ₂	COOCH ₂ CH=CH ₂	Ms	H
	Et	H	OCH(CH ₃) ₂	COOCH ₂ C≡CH	Ms	H
15	Et	H	CH ₂ OCH ₃	COOMe	Ms	H
	Et	H	CH ₂ OCH ₃	COOMe	Cl	H
	Et	H	CH ₂ OCH ₃	COOEt	Ms	H
	Et	H	CH ₂ OCH ₃	COOEt	Cl	H
	Et	H	CH ₂ OCH ₃	COOCH(CH ₃) ₂	Ms	H
20	Et	H	CH ₂ OCH ₃	COOCH(CH ₃) ₂	Cl	H
	Et	H	CH ₂ OCH ₃	CON(CH ₃) ₂	Ms	H
	Et	H	CH ₂ OCH ₃	CON(CH ₃) ₂	Cl	H
	Et	H	CH ₂ OCH ₃	CONHMe	Ms	H
25	Et	H	CH ₂ OCH ₃	CONHEt	Ms	H
	Et	H	CH ₂ OCH ₃	CONHC ₃ H ₇	Ms	H
	Et	H	CH ₂ OCH ₃	CONHCH(CH ₃) ₂	Ms	H
	Et	H	CH ₂ OCH ₃	CONHC(CH ₃) ₃	Ms	H
	Et	H	CH ₂ OCH ₃	CONEt ₂	Ms	H
30	Et	H	CH ₂ OCH ₃	CONHC(CH ₃) ₃	Ms	H
	Et	H	CH ₂ OCH ₃	CONHC ₄ H ₉	Ms	H
	Et	H	CH ₂ OCH ₃	CONHC ₄ H ₉	Ms	H
	Et	H	CH ₂ OCH ₃	CON (CH(CH ₃) ₂) ₂	Ms	H
35	Et	H	CH ₂ OCH ₃	Y1	Ms	H
	Et	H	CH ₂ OCH ₃	Y2	Ms	H
	Et	H	CH ₂ OCH ₃	COOPh	Ms	H
	Et	H	CH ₂ OCH ₃	COOCH ₂ Ph	Ms	H
	Et	H	CH ₂ OCH ₃	COOCH ₂ CH=CH ₂	Ms	H
40	Et	H	CH ₂ OCH ₃	COOCH ₂ C≡CH	Ms	H
	i-Pr	H	Cl	COOMe	MeS	H
	i-Pr	H	Cl	COOMe	MeSO	H
	i-Pr	H	Cl	COOMe	Ms	H
	i-Pr	H	Cl	COOMe	Ms	Q1
45	i-Pr	H	Cl	COOMe	Ms	Q2
	i-Pr	H	Cl	COOMe	Ms	Q3
	i-Pr	H	Cl	COOMe	Ms	Q4
	i-Pr	H	Cl	COOMe	Ms	Q5

50

55

	A	B	X	Y	Z	Q
5	i-Pr	H	Cl	COOMe	Ms	Q6
	i-Pr	H	Cl	COOMe	Ms	Q20
	i-Pr	Me	Cl	COOMe	Ms	H
	i-Pr	Cl	Cl	COOMe	Ms	H
10	i-Pr	CF ₃	Cl	COOMe	Ms	H
	i-Pr	OMe	Cl	COOMe	Ms	H
	i-Pr	SMe	Cl	COOMe	Ms	H
	i-Pr	H	Cl	COOEt	MeS	H
15	i-Pr	H	Cl	COOEt	MeSO	H
	i-Pr	H	Cl	COOEt	Ms	H
	i-Pr	H	Cl	COOEt	Ms	Q1
	i-Pr	H	Cl	COOEt	Ms	Q18
	i-Pr	H	Cl	COOEt	Ms	Q13
20	i-Pr	H	Cl	COOEt	Ms	Q4
	i-Pr	H	Cl	COOEt	Ms	Q5
	i-Pr	H	Cl	COOEt	Ms	Q6
	i-Pr	H	Cl	COOEt	Ms	Q22
	i-Pr	Me	Cl	COOEt	Ms	H
25	i-Pr	Cl	Cl	COOEt	Ms	H
	i-Pr	CF ₃	Cl	COOEt	Ms	H
	i-Pr	OMe	Cl	COOEt	Ms	H
	i-Pr	SMe	Cl	COOEt	Ms	H
30	i-Pr	H	Cl	COOCH(CH ₃) ₂	MeS	H
	i-Pr	H	Cl	COOCH(CH ₃) ₂	MeSO	H
	i-Pr	H	Cl	COOCH(CH ₃) ₂	Ms	H
	i-Pr	H	Cl	COOCH(CH ₃) ₂	Ms	Q7
	i-Pr	H	Cl	COOCH(CH ₃) ₂	Ms	Q12
35	i-Pr	H	Cl	COOCH(CH ₃) ₂	Ms	Q9
	i-Pr	H	Cl	COOCH(CH ₃) ₂	Ms	Q4
	i-Pr	H	Cl	COOCH(CH ₃) ₂	Ms	Q5
	i-Pr	H	Cl	COOCH(CH ₃) ₂	Ms	Q6
	i-Pr	H	Cl	COOCH(CH ₃) ₂	Ms	Q17
40	i-Pr	Me	Cl	COOCH(CH ₃) ₂	Ms	H
	i-Pr	Cl	Cl	COOCH(CH ₃) ₂	Ms	H
	i-Pr	CF ₃	Cl	COOCH(CH ₃) ₂	Ms	H
	i-Pr	OMe	Cl	COOCH(CH ₃) ₂	Ms	H
45	i-Pr	SMe	Cl	COOCH(CH ₃) ₂	Ms	H
	i-Pr	H	Cl	COOMe	Cl	H
	i-Pr	H	Cl	COOMe	Cl	Q1
	i-Pr	H	Cl	COOMe	Cl	Q2
50						
55						

	A	B	X	Y	Z	Q
5	i-Pr	H	Cl	COOMe	Cl	Q3
	i-Pr	H	Cl	COOEt	Cl	H
	i-Pr	H	Cl	COOEt	Cl	Q1
	i-Pr	H	Cl	COOEt	Cl	Q2
10	i-Pr	H	Cl	COOEt	Cl	Q3
	i-Pr	H	Cl	COOCH(CH ₃) ₂	Cl	H
	i-Pr	H	Cl	COOCH(CH ₃) ₂	Cl	Q1
	i-Pr	H	Cl	COOCH(CH ₃) ₂	Cl	Q2
	i-Pr	H	Cl	COOCH(CH ₃) ₂	Cl	Q3
15	i-Pr	H	Cl	CON(CH ₃) ₂	MeS	H
	i-Pr	H	Cl	CON(CH ₃) ₂	MeSO	H
	i-Pr	H	Cl	CON(CH ₃) ₂	Ms	H
	i-Pr	H	Cl	CON(CH ₃) ₂	Ms	Q1
20	i-Pr	H	Cl	CON(CH ₃) ₂	Ms	Q18
	i-Pr	H	Cl	CON(CH ₃) ₂	Ms	Q13
	i-Pr	H	Cl	CON(CH ₃) ₂	Ms	Q4
	i-Pr	H	Cl	CON(CH ₃) ₂	Ms	Q5
	i-Pr	H	Cl	CON(CH ₃) ₂	Ms	Q6
25	i-Pr	H	Cl	CON(CH ₃) ₂	Ms	Q22
	i-Pr	Me	Cl	CON(CH ₃) ₂	Ms	H
	i-Pr	Cl	Cl	CON(CH ₃) ₂	Ms	H
	i-Pr	CF ₃	Cl	CON(CH ₃) ₂	Ms	H
30	i-Pr	OMe	Cl	CON(CH ₃) ₂	Ms	H
	i-Pr	SMe	Cl	CON(CH ₃) ₂	Ms	H
	i-Pr	H	Cl	CON(CH ₃) ₂	Cl	H
	i-Pr	H	Cl	CON(CH ₃) ₂	Cl	Q1
	i-Pr	H	Cl	CON(CH ₃) ₂	Cl	Q2
35	i-Pr	H	Cl	CON(CH ₃) ₂	Cl	Q3
	i-Pr	H	Cl	COOC ₄ H ₉	Ms	H
	i-Pr	H	Cl	COOC ₄ H ₉	Cl	H
	i-Pr	H	Cl	COOCH ₂ CH(CH ₃) ₂	Ms	H
	i-Pr	H	Cl	COOCH ₂ CH(CH ₃) ₂	Cl	H
40	i-Pr	H	Cl	COOCH(CH ₃)C ₂ H ₅	Ms	H
	i-Pr	H	Cl	COOCH(CH ₃)C ₂ H ₅	Cl	H
	i-Pr	H	Cl	COOC(CH ₃) ₃	Ms	H
	i-Pr	H	Cl	COOC(CH ₃) ₃	Cl	H
45	i-Pr	H	Cl	CONHMe	Ms	H
	i-Pr	H	Cl	CONHMe	Cl	H
	i-Pr	H	Cl	CONHEt	Ms	H
	i-Pr	H	Cl	CONHEt	Cl	H

50

55

	A	B	X	Y	Z	Q
5	i-Pr	H	Cl	CONHCH(CH ₃) ₂	Ms	H
	i-Pr	H	Cl	CONHCH(CH ₃) ₂	Cl	H
	i-Pr	H	Cl	CONHC(CH ₃) ₃	Ms	H
	i-Pr	H	Cl	CONHC(CH ₃) ₃	Cl	H
10	i-Pr	H	Cl	CONHC ₄ H ₉	Ms	H
	i-Pr	H	Cl	CONHC ₄ H ₉	Cl	H
	i-Pr	H	Cl	CONHCH ₂ CH(CH ₃) ₂	Ms	H
	i-Pr	H	Cl	CONHCH ₂ CH(CH ₃) ₂	Cl	H
15	i-Pr	H	Cl	CONHCH(CH ₃)C ₂ H ₅	Ms	H
	i-Pr	H	Cl	CONHCH(CH ₃)C ₂ H ₅	Cl	H
	i-Pr	H	Cl	CONEt ₂	Ms	H
	i-Pr	H	Cl	CONEt ₂	Cl	H
	i-Pr	H	Cl	CON(CH(CH ₃) ₂) ₂	Ms	H
20	i-Pr	H	Cl	CON(CH(CH ₃) ₂) ₂	Cl	H
	i-Pr	H	Cl	Y1	Ms	H
	i-Pr	H	Cl	Y1	Cl	H
	i-Pr	H	Cl	Y2	Ms	H
	i-Pr	H	Cl	Y2	Cl	H
25	i-Pr	H	Cl	Y3	Ms	H
	i-Pr	H	Cl	Y3	Cl	H
	i-Pr	H	Cl	COOPh	Ms	H
	i-Pr	H	Cl	COOPh	Cl	H
30	i-Pr	H	Cl	COOCH ₂ Ph	Ms	H
	i-Pr	H	Cl	COOCH ₂ Ph	Cl	H
	i-Pr	H	Cl	COOCH ₂ CH=CH ₂	Ms	H
	i-Pr	H	Cl	COOCH ₂ CH=CH ₂	Cl	H
	i-Pr	H	Cl	COOCH ₂ C≡CH	Ms	H
35	i-Pr	H	Cl	COOCH ₂ C≡CH	Cl	H
	i-Pr	H	Cl	C(O)SMe	Ms	H
	i-Pr	H	Cl	C(O)SMe	Cl	H
	i-Pr	H	Cl	C(O)SEt	Ms	H
	i-Pr	H	Cl	C(O)SEt	Cl	H
40	i-Pr	H	Cl	C(O)SCH(CH ₃) ₂	Ms	H
	i-Pr	H	Cl	C(O)SCH(CH ₃) ₂	Cl	H
	i-Pr	H	Cl	C(O)SC ₃ H ₇	Ms	H
	i-Pr	H	Cl	C(O)SC ₃ H ₇	Cl	H
45	i-Pr	H	Cl	C(S)OMe	Ms	H
	i-Pr	H	Cl	C(S)OMe	Cl	H
	i-Pr	H	Cl	C(S)OEt	Ms	H
	i-Pr	H	Cl	C(S)OEt	Cl	H

50

55

	A	B	X	Y	Z	Q
5	i-Pr	H	Cl	C(S) OCH(CH ₃) ₂	Ms	H
	i-Pr	H	Cl	C(S) OCH(CH ₃) ₂	Cl	H
	i-Pr	H	Cl	C(S) SC ₃ H ₇	Ms	H
10	i-Pr	H	Cl	C(S) SC ₃ H ₇	Cl	H
	i-Pr	H	Cl	C(S) SMe	Ms	H
	i-Pr	H	Cl	C(S) SMe	Cl	H
	i-Pr	H	Cl	C(S) SEt	Ms	H
	i-Pr	H	Cl	C(S) SEt	Cl	H
15	i-Pr	H	Cl	C(S) SCH(CH ₃) ₂	Ms	H
	i-Pr	H	Cl	C(S) SCH(CH ₃) ₂	Cl	H
	i-Pr	H	Cl	C(S) SC ₃ H ₇	Ms	H
	i-Pr	H	Cl	C(S) SC ₃ H ₇	Cl	H
	i-Pr	H	Me	COOMe	MeS	H
20	i-Pr	H	Me	COOMe	MeSO	H
	i-Pr	H	Me	COOMe	Ms	H
	i-Pr	H	Me	COOMe	Ms	Q1
	i-Pr	H	Me	COOMe	Ms	Q2
25	i-Pr	H	Me	COOMe	Ms	Q3
	i-Pr	H	Me	COOMe	Ms	Q4
	i-Pr	H	Me	COOMe	Ms	Q5
	i-Pr	H	Me	COOMe	Ms	Q6
	i-Pr	H	Me	COOMe	Ms	Q20
30	i-Pr	Me	Me	COOMe	Ms	H
	i-Pr	Cl	Me	COOMe	Ms	H
	i-Pr	CF ₃	Me	COOMe	Ms	H
	i-Pr	OMe	Me	COOMe	Ms	H
	i-Pr	SMe	Me	COOMe	Ms	H
35	i-Pr	H	Me	COOEt	MeS	H
	i-Pr	H	Me	COOEt	MeSO	H
	i-Pr	H	Me	COOEt	Ms	H
	i-Pr	H	Me	COOEt	Ms	Q1
40	i-Pr	H	Me	COOEt	Ms	Q18
	i-Pr	H	Me	COOEt	Ms	Q13
	i-Pr	H	Me	COOEt	Ms	Q4
	i-Pr	H	Me	COOEt	Ms	Q5
	i-Pr	H	Me	COOEt	Ms	Q6
45	i-Pr	H	Me	COOEt	Ms	Q22
	i-Pr	Me	Me	COOEt	Ms	H
	i-Pr	Cl	Me	COOEt	Ms	H
	i-Pr	CF ₃	Me	COOEt	Ms	H
50						
55						

	A	B	X	Y	Z	Q
5	i-Pr	OMe	Me	COOEt	Ms	H
	i-Pr	SMe	Me	COOEt	Ms	H
	i-Pr	H	Me	COOCH(CH ₃) ₂	MeS	H
	i-Pr	H	Me	COOCH(CH ₃) ₂	MeSO	H
10	i-Pr	H	Me	COOCH(CH ₃) ₂	Ms	H
	i-Pr	H	Me	COOCH(CH ₃) ₂	Ms	Q7
	i-Pr	H	Me	COOCH(CH ₃) ₂	Ms	Q12
	i-Pr	H	Me	COOCH(CH ₃) ₂	Ms	Q9
15	i-Pr	H	Me	COOCH(CH ₃) ₂	Ms	Q4
	i-Pr	H	Me	COOCH(CH ₃) ₂	Ms	Q5
	i-Pr	H	Me	COOCH(CH ₃) ₂	Ms	Q6
	i-Pr	H	Me	COOCH(CH ₃) ₂	Ms	Q17
	i-Pr	Me	Me	COOCH(CH ₃) ₂	Ms	H
20	i-Pr	Cl	Me	COOCH(CH ₃) ₂	Ms	H
	i-Pr	CF ₃	Me	COOCH(CH ₃) ₂	Ms	H
	i-Pr	OMe	Me	COOCH(CH ₃) ₂	Ms	H
	i-Pr	SMe	Me	COOCH(CH ₃) ₂	Ms	H
25	i-Pr	H	Me	COOMe	Cl	H
	i-Pr	H	Me	COOMe	Cl	Q1
	i-Pr	H	Me	COOMe	Cl	Q2
	i-Pr	H	Me	COOMe	Cl	Q3
	i-Pr	H	Me	COOEt	Cl	H
30	i-Pr	H	Me	COOEt	Cl	Q1
	i-Pr	H	Me	COOEt	Cl	Q2
	i-Pr	H	Me	COOEt	Cl	Q3
	i-Pr	H	Me	COOCH(CH ₃) ₂	Cl	H
35	i-Pr	H	Me	COOCH(CH ₃) ₂	Cl	Q1
	i-Pr	H	Me	COOCH(CH ₃) ₂	Cl	Q2
	i-Pr	H	Me	COOCH(CH ₃) ₂	Cl	Q3
	i-Pr	H	Me	CON(CH ₃) ₂	MeS	H
	i-Pr	H	Me	CON(CH ₃) ₂	MeSO	H
40	i-Pr	H	Me	CON(CH ₃) ₂	Ms	H
	i-Pr	H	Me	CON(CH ₃) ₂	Ms	Q1
	i-Pr	H	Me	CON(CH ₃) ₂	Ms	Q18
	i-Pr	H	Me	CON(CH ₃) ₂	Ms	Q13
	i-Pr	H	Me	CON(CH ₃) ₂	Ms	Q4
45	i-Pr	H	Me	CON(CH ₃) ₂	Ms	Q5
	i-Pr	H	Me	CON(CH ₃) ₂	Ms	Q6
	i-Pr	H	Me	CON(CH ₃) ₂	Ms	Q22
	i-Pr	Me	Me	CON(CH ₃) ₂	Ms	H

50

55

	A	B	X	Y	Z	Q
5	i-Pr	Cl	Me	CON(CH ₃) ₂	Ms	H
	i-Pr	CF ₃	Me	CON(CH ₃) ₂	Ms	H
	i-Pr	OMe	Me	CON(CH ₃) ₂	Ms	H
	i-Pr	SMe	Me	CON(CH ₃) ₂	Ms	H
10	i-Pr	H	Me	CON(CH ₃) ₂	Cl	H
	i-Pr	H	Me	CON(CH ₃) ₂	Cl	Q1
	i-Pr	H	Me	CON(CH ₃) ₂	Cl	Q2
	i-Pr	H	Me	CON(CH ₃) ₂	Cl	Q3
15	i-Pr	H	Me	COOC ₄ H ₉	Ms	H
	i-Pr	H	Me	COOC ₄ H ₉	Cl	H
	i-Pr	H	Me	COOCH ₂ CH(CH ₃) ₂	Ms	H
	i-Pr	H	Me	COOCH ₂ CH(CH ₃) ₂	Cl	H
	i-Pr	H	Me	COOCH(CH ₃)C ₂ H ₅	Ms	H
20	i-Pr	H	Me	COOCH(CH ₃)C ₂ H ₅	Cl	H
	i-Pr	H	Me	COOC(CH ₃) ₃	Ms	H
	i-Pr	H	Me	COOC(CH ₃) ₃	Cl	H
	i-Pr	H	Me	CONHMe	Ms	H
25	i-Pr	H	Me	CONHMe	Cl	H
	i-Pr	H	Me	CONHEt	Ms	H
	i-Pr	H	Me	CONHEt	Cl	H
	i-Pr	H	Me	CONHCH(CH ₃) ₂	Ms	H
	i-Pr	H	Me	CONHCH(CH ₃) ₂	Cl	H
30	i-Pr	H	Me	CONHC(CH ₃) ₃	Ms	H
	i-Pr	H	Me	CONHC(CH ₃) ₃	Cl	H
	i-Pr	H	Me	CONHC ₄ H ₉	Ms	H
	i-Pr	H	Me	CONHC ₄ H ₉	Cl	H
	i-Pr	H	Me	CONHCH ₂ CH(CH ₃) ₂	Ms	H
35	i-Pr	H	Me	CONHCH ₂ CH(CH ₃) ₂	Cl	H
	i-Pr	H	Me	CONHCH(CH ₃)C ₂ H ₅	Ms	H
	i-Pr	H	Me	CONHCH(CH ₃)C ₂ H ₅	Cl	H
	i-Pr	H	Me	CONEt ₂	Ms	H
40	i-Pr	H	Me	CONEt ₂	Cl	H
	i-Pr	H	Me	CON(CH(CH ₃) ₂) ₂	Ms	H
	i-Pr	H	Me	CON(CH(CH ₃) ₂) ₂	Cl	H
	i-Pr	H	Me	Y1	Ms	H
	i-Pr	H	Me	Y1	Cl	H
45	i-Pr	H	Me	Y2	Ms	H
	i-Pr	H	Me	Y2	Cl	H
	i-Pr	H	Me	Y3	Ms	H
	i-Pr	H	Me	Y3	Cl	H

50

55

	A	B	X	Y	Z	Q
5	i-Pr	H	Me	COOPh	Ms	H
	i-Pr	H	Me	COOPh	Cl	H
	i-Pr	H	Me	COOCH ₂ Ph	Ms	H
10	i-Pr	H	Me	COOCH ₂ Ph	Cl	H
	i-Pr	H	Me	COOCH ₂ CH=CH ₂	Ms	H
	i-Pr	H	Me	COOCH ₂ CH=CH ₂	Cl	H
	i-Pr	H	Me	COOCH ₂ C≡CH	Ms	H
	i-Pr	H	Me	COOCH ₂ C≡CH	Cl	H
15	i-Pr	H	Me	C(O)SMe	Ms	H
	i-Pr	H	Me	C(O)SMe	Cl	H
	i-Pr	H	Me	C(O)SEt	Ms	H
	i-Pr	H	Me	C(O)SEt	Cl	H
20	i-Pr	H	Me	C(O)SCH(CH ₃) ₂	Ms	H
	i-Pr	H	Me	C(O)SCH(CH ₃) ₂	Cl	H
	i-Pr	H	Me	C(O)SC ₃ H ₇	Ms	H
	i-Pr	H	Me	C(O)SC ₃ H ₇	Cl	H
	i-Pr	H	Me	C(S)OMe	Ms	H
25	i-Pr	H	Me	C(S)OMe	Cl	H
	i-Pr	H	Me	C(S)OEt	Ms	H
	i-Pr	H	Me	C(S)OEt	Cl	H
	i-Pr	H	Me	C(S)OCH(CH ₃) ₂	Ms	H
	i-Pr	H	Me	C(S)OCH(CH ₃) ₂	Cl	H
30	i-Pr	H	Me	C(S)SC ₃ H ₇	Ms	H
	i-Pr	H	Me	C(S)SC ₃ H ₇	Cl	H
	i-Pr	H	Me	C(S)SMe	Ms	H
	i-Pr	H	Me	C(S)SMe	Cl	H
	i-Pr	H	Me	C(S)SEt	Ms	H
35	i-Pr	H	Me	C(S)SEt	Cl	H
	i-Pr	H	Me	C(S)SCH(CH ₃) ₂	Ms	H
	i-Pr	H	Me	C(S)SCH(CH ₃) ₂	Cl	H
	i-Pr	H	Me	C(S)SC ₃ H ₇	Ms	H
40	i-Pr	H	Me	C(S)SC ₃ H ₇	Cl	H
	i-Pr	H	OMe	COOMe	MeS	H
	i-Pr	H	OMe	COOMe	MeSO	H
	i-Pr	H	OMe	COOMe	Ms	H
	i-Pr	H	OMe	COOMe	Ms	Q1
45	i-Pr	H	OMe	COOMe	Ms	Q2
	i-Pr	H	OMe	COOMe	Ms	Q3
	i-Pr	H	OMe	COOMe	Ms	Q4
	i-Pr	H	OMe	COOMe	Ms	Q5
50						
55						

	A	B	X	Y	Z	Q
5	i-Pr	H	OMe	COOMe	Ms	Q6
	i-Pr	H	OMe	COOMe	Ms	Q20
	i-Pr	Me	OMe	COOMe	Ms	H
10	i-Pr	Cl	OMe	COOMe	Ms	H
	i-Pr	CF ₃	OMe	COOMe	Ms	H
	i-Pr	OMe	OMe	COOMe	Ms	H
	i-Pr	SMe	OMe	COOMe	Ms	H
	i-Pr	H	OMe	COOEt	MeS	H
15	i-Pr	H	OMe	COOEt	MeSO	H
	i-Pr	H	OMe	COOEt	Ms	H
	i-Pr	H	OMe	COOEt	Ms	Q1
	i-Pr	H	OMe	COOEt	Ms	Q18
20	i-Pr	H	OMe	COOEt	Ms	Q13
	i-Pr	H	OMe	COOEt	Ms	Q4
	i-Pr	H	OMe	COOEt	Ms	Q5
	i-Pr	H	OMe	COOEt	Ms	Q6
	i-Pr	H	OMe	COOEt	Ms	Q22
25	i-Pr	Me	OMe	COOEt	Ms	H
	i-Pr	Cl	OMe	COOEt	Ms	H
	i-Pr	CF ₃	OMe	COOEt	Ms	H
	i-Pr	OMe	OMe	COOEt	Ms	H
	i-Pr	SMe	OMe	COOEt	Ms	H
30	i-Pr	H	OMe	COOCH(CH ₃) ₂	MeS	H
	i-Pr	H	OMe	COOCH(CH ₃) ₂	MeSO	H
	i-Pr	H	OMe	COOCH(CH ₃) ₂	Ms	H
	i-Pr	H	OMe	COOCH(CH ₃) ₂	Ms	Q7
35	i-Pr	H	OMe	COOCH(CH ₃) ₂	Ms	Q12
	i-Pr	H	OMe	COOCH(CH ₃) ₂	Ms	Q9
	i-Pr	H	OMe	COOCH(CH ₃) ₂	Ms	Q4
	i-Pr	H	OMe	COOCH(CH ₃) ₂	Ms	Q5
	i-Pr	H	OMe	COOCH(CH ₃) ₂	Ms	Q6
40	i-Pr	H	OMe	COOCH(CH ₃) ₂	Ms	Q17
	i-Pr	Me	OMe	COOCH(CH ₃) ₂	Ms	H
	i-Pr	Cl	OMe	COOCH(CH ₃) ₂	Ms	H
	i-Pr	CF ₃	OMe	COOCH(CH ₃) ₂	Ms	H
	i-Pr	OMe	OMe	COOCH(CH ₃) ₂	Ms	H
45	i-Pr	SMe	OMe	COOCH(CH ₃) ₂	Ms	H
	i-Pr	H	OMe	COOMe	Cl	H
	i-Pr	H	OMe	COOMe	Cl	Q1
	i-Pr	H	OMe	COOMe	Cl	Q2
50						
55						

	A	B	X	Y	Z	Q
5	i-Pr	H	OMe	COOMe	Cl	Q3
	i-Pr	H	OMe	COOEt	Cl	H
	i-Pr	H	OMe	COOEt	Cl	Q1
	i-Pr	H	OMe	COOEt	Cl	Q2
10	i-Pr	H	OMe	COOEt	Cl	Q3
	i-Pr	H	OMe	COOCH(CH ₃) ₂	Cl	H
	i-Pr	H	OMe	COOCH(CH ₃) ₂	Cl	Q1
	i-Pr	H	OMe	COOCH(CH ₃) ₂	Cl	Q2
15	i-Pr	H	OMe	COOCH(CH ₃) ₂	Cl	Q3
	i-Pr	H	OMe	CON(CH ₃) ₂	MeS	H
	i-Pr	H	OMe	CON(CH ₃) ₂	MeSO	H
	i-Pr	H	OMe	CON(CH ₃) ₂	Ms	H
	i-Pr	H	OMe	CON(CH ₃) ₂	Ms	Q1
20	i-Pr	H	OMe	CON(CH ₃) ₂	Ms	Q18
	i-Pr	H	OMe	CON(CH ₃) ₂	Ms	Q13
	i-Pr	H	OMe	CON(CH ₃) ₂	Ms	Q4
	i-Pr	H	OMe	CON(CH ₃) ₂	Ms	Q5
25	i-Pr	H	OMe	CON(CH ₃) ₂	Ms	Q6
	i-Pr	H	OMe	CON(CH ₃) ₂	Ms	Q22
	i-Pr	Me	OMe	CON(CH ₃) ₂	Ms	H
	i-Pr	Cl	OMe	CON(CH ₃) ₂	Ms	H
	i-Pr	CF ₃	OMe	CON(CH ₃) ₂	Ms	H
30	i-Pr	OMe	OMe	CON(CH ₃) ₂	Ms	H
	i-Pr	SMe	OMe	CON(CH ₃) ₂	Ms	H
	i-Pr	H	OMe	CON(CH ₃) ₂	Cl	H
	i-Pr	H	OMe	CON(CH ₃) ₂	Cl	Q1
	i-Pr	H	OMe	CON(CH ₃) ₂	Cl	Q2
35	i-Pr	H	OMe	CON(CH ₃) ₂	Cl	Q3
	i-Pr	H	OMe	COOC ₄ H ₉	Ms	H
	i-Pr	H	OMe	COOC ₄ H ₉	Cl	H
	i-Pr	H	OMe	COOCH ₂ CH(CH ₃) ₂	Ms	H
40	i-Pr	H	OMe	COOCH ₂ CH(CH ₃) ₂	Cl	H
	i-Pr	H	OMe	COOCH(CH ₃)C ₂ H ₅	Ms	H
	i-Pr	H	OMe	COOCH(CH ₃)C ₂ H ₅	Cl	H
	i-Pr	H	OMe	COOC(CH ₃) ₃	Ms	H
	i-Pr	H	OMe	COOC(CH ₃) ₃	Cl	H
45	i-Pr	H	OMe	CONHMe	Ms	H
	i-Pr	H	OMe	CONHMe	Cl	H
	i-Pr	H	OMe	CONHEt	Ms	H
	i-Pr	H	OMe	CONHEt	Cl	H
50						
55						

	A	B	X	Y	Z	Q
5	i-Pr	H	OMe	CONHCH(CH ₃) ₂	Ms	H
	i-Pr	H	OMe	CONHCH(CH ₃) ₂	Cl	H
	i-Pr	H	OMe	CONHC(CH ₃) ₃	Ms	H
	i-Pr	H	OMe	CONHC(CH ₃) ₃	Cl	H
10	i-Pr	H	OMe	CONHC ₄ H ₉	Ms	H
	i-Pr	H	OMe	CONHC ₄ H ₉	Cl	H
	i-Pr	H	OMe	CONHCH ₂ CH(CH ₃) ₂	Ms	H
	i-Pr	H	OMe	CONHCH ₂ CH(CH ₃) ₂	Cl	H
	i-Pr	H	OMe	CONHCH(CH ₃)C ₂ H ₅	Ms	H
15	i-Pr	H	OMe	CONHCH(CH ₃)C ₂ H ₅	Cl	H
	i-Pr	H	OMe	CONEt ₂	Ms	H
	i-Pr	H	OMe	CONEt ₂	Cl	H
	i-Pr	H	OMe	CON(CH(CH ₃) ₂) ₂	Ms	H
20	i-Pr	H	OMe	CON(CH(CH ₃) ₂) ₂	Cl	H
	i-Pr	H	OMe	Y1	Ms	H
	i-Pr	H	OMe	Y1	Cl	H
	i-Pr	H	OMe	Y2	Ms	H
	i-Pr	H	OMe	Y2	Cl	H
25	i-Pr	H	OMe	Y3	Ms	H
	i-Pr	H	OMe	Y3	Cl	H
	i-Pr	H	OMe	COOPh	Ms	H
	i-Pr	H	OMe	COOPh	Cl	H
30	i-Pr	H	OMe	COOCH ₂ Ph	Ms	H
	i-Pr	H	OMe	COOCH ₂ Ph	Cl	H
	i-Pr	H	OMe	COOCH ₂ CH=CH ₂	Ms	H
	i-Pr	H	OMe	COOCH ₂ CH=CH ₂	Cl	H
	i-Pr	H	OMe	COOCH ₂ C≡CH	Ms	H
35	i-Pr	H	OMe	COOCH ₂ C≡CH	Cl	H
	i-Pr	H	OMe	C(O)SMe	Ms	H
	i-Pr	H	OMe	C(O)SMe	Cl	H
	i-Pr	H	OMe	C(O)SEt	Ms	H
	i-Pr	H	OMe	C(O)SEt	Cl	H
40	i-Pr	H	OMe	C(O)SCH(CH ₃) ₂	Ms	H
	i-Pr	H	OMe	C(O)SCH(CH ₃) ₂	Cl	H
	i-Pr	H	OMe	C(O)SC ₃ H ₇	Ms	H
	i-Pr	H	OMe	C(O)SC ₃ H ₇	Cl	H
45	i-Pr	H	OMe	C(S)OMe	Ms	H
	i-Pr	H	OMe	C(S)OMe	Cl	H
	i-Pr	H	OMe	C(S)OEt	Ms	H
	i-Pr	H	OMe	C(S)OEt	Cl	H

50

55

	A	B	X	Y	Z	Q
5	i-Pr	H	OMe	C(S) OCH(CH ₃) ₂	Ms	H
	i-Pr	H	OMe	C(S) OCH(CH ₃) ₂	Cl	H
	i-Pr	H	OMe	C(S) SC ₃ H ₇	Ms	H
	i-Pr	H	OMe	C(S) SC ₃ H ₇	Cl	H
10	i-Pr	H	OMe	C(S) SMe	Ms	H
	i-Pr	H	OMe	C(S) SMe	Cl	H
	i-Pr	H	OMe	C(S) SEt	Ms	H
	i-Pr	H	OMe	C(S) SEt	Cl	H
15	i-Pr	H	OMe	C(S) SCH(CH ₃) ₂	Ms	H
	i-Pr	H	OMe	C(S) SCH(CH ₃) ₂	Cl	H
	i-Pr	H	OMe	C(S) SC ₃ H ₇	Ms	H
	i-Pr	H	OMe	C(S) SC ₃ H ₇	Cl	H
	i-Pr	H	Br	COOMe	Ms	H
20	i-Pr	H	Br	COOMe	Cl	H
	i-Pr	H	Br	COOEt	Ms	H
	i-Pr	H	Br	COOEt	Cl	H
	i-Pr	H	Br	COOCH(CH ₃) ₂	Ms	H
	i-Pr	H	Br	COOCH(CH ₃) ₂	Cl	H
25	i-Pr	H	Br	CON(CH ₃) ₂	Ms	H
	i-Pr	H	Br	CON(CH ₃) ₂	Cl	H
	i-Pr	H	Br	CONHMe	Ms	H
	i-Pr	H	Br	CONHEt	Ms	H
30	i-Pr	H	Br	CONHC ₃ H ₇	Ms	H
	i-Pr	H	Br	CONHCH(CH ₃) ₂	Ms	H
	i-Pr	H	Br	CONHC(CH ₃) ₃	Ms	H
	i-Pr	H	Br	CONEt ₂	Ms	H
	i-Pr	H	Br	CONHC(CH ₃) ₃	Ms	H
35	i-Pr	H	Br	CONHC ₄ H ₉	Ms	H
	i-Pr	H	Br	CONHC ₄ H ₉	Ms	H
	i-Pr	H	Br	CON(CH(CH ₃) ₂) ₂	Ms	H
	i-Pr	H	Br	Y1	Ms	H
	i-Pr	H	Br	Y2	Ms	H
40	i-Pr	H	Br	COOPh	Ms	H
	i-Pr	H	Br	COOCH ₂ Ph	Ms	H
	i-Pr	H	Br	COOCH ₂ CH=CH ₂	Ms	H
	i-Pr	H	Br	COOCH ₂ C≡CH	Ms	H
45	i-Pr	H	OEt	COOMe	Ms	H
	i-Pr	H	OEt	COOMe	Cl	H
	i-Pr	H	OEt	COOEt	Ms	H
	i-Pr	H	OEt	COOEt	Cl	H

50

55

	A	B	X	Y	Z	Q
5	i-Pr	H	OEt	COOCH(CH ₃) ₂	Ms	H
	i-Pr	H	OEt	COOCH(CH ₃) ₂	Cl	H
	i-Pr	H	OEt	CON(CH ₃) ₂	Ms	H
10	i-Pr	H	OEt	CON(CH ₃) ₂	Cl	H
	i-Pr	H	OEt	CONHMe	Ms	H
	i-Pr	H	OEt	CONHEt	Ms	H
	i-Pr	H	OEt	CONHC ₃ H ₇	Ms	H
	i-Pr	H	OEt	CONHCH(CH ₃) ₂	Ms	H
15	i-Pr	H	OEt	CONHC(CH ₃) ₃	Ms	H
	i-Pr	H	OEt	CONEt ₂	Ms	H
	i-Pr	H	OEt	CONHC(CH ₃) ₃	Ms	H
	i-Pr	H	OEt	CONHC ₄ H ₉	Ms	H
	i-Pr	H	OEt	CONHC ₄ H ₉	Ms	H
20	i-Pr	H	OEt	CON(CH(CH ₃) ₂) ₂	Ms	H
	i-Pr	H	OEt	Y1	Ms	H
	i-Pr	H	OEt	Y2	Ms	H
	i-Pr	H	OEt	COOPh	Ms	H
25	i-Pr	H	OEt	COOCH ₂ Ph	Ms	H
	i-Pr	H	OEt	COOCH ₂ CH=CH ₂	Ms	H
	i-Pr	H	OEt	COOCH ₂ C≡CH	Ms	H
	i-Pr	H	OCH(CH ₃) ₂	COOMe	Ms	H
	i-Pr	H	OCH(CH ₃) ₂	COOMe	Cl	H
30	i-Pr	H	OCH(CH ₃) ₂	COOEt	Ms	H
	i-Pr	H	OCH(CH ₃) ₂	COOEt	Cl	H
	i-Pr	H	OCH(CH ₃) ₂	COOCH(CH ₃) ₂	Ms	H
	i-Pr	H	OCH(CH ₃) ₂	COOCH(CH ₃) ₂	Cl	H
	i-Pr	H	OCH(CH ₃) ₂	CON(CH ₃) ₂	Ms	H
35	i-Pr	H	OCH(CH ₃) ₂	CON(CH ₃) ₂	Cl	H
	i-Pr	H	OCH(CH ₃) ₂	CONHMe	Ms	H
	i-Pr	H	OCH(CH ₃) ₂	CONHEt	Ms	H
	i-Pr	H	OCH(CH ₃) ₂	CONHC ₃ H ₇	Ms	H
40	i-Pr	H	OCH(CH ₃) ₂	CONHCH(CH ₃) ₂	Ms	H
	i-Pr	H	OCH(CH ₃) ₂	CONHC(CH ₃) ₃	Ms	H
	i-Pr	H	OCH(CH ₃) ₂	CONEt ₂	Ms	H
	i-Pr	H	OCH(CH ₃) ₂	CONHC(CH ₃) ₃	Ms	H
	i-Pr	H	OCH(CH ₃) ₂	CONHC ₄ H ₉	Ms	H
45	i-Pr	H	OCH(CH ₃) ₂	CONHC ₄ H ₉	Ms	H
	i-Pr	H	OCH(CH ₃) ₂	CON(CH(CH ₃) ₂) ₂	Ms	H
	i-Pr	H	OCH(CH ₃) ₂	Y1	Ms	H
	i-Pr	H	OCH(CH ₃) ₂	Y2	Ms	H

50

55

	A	B	X	Y	Z	Q
5	i-Pr	H	$\text{OCH}(\text{CH}_3)_2$	COOPh	Ms	H
	i-Pr	H	$\text{OCH}(\text{CH}_3)_2$	COOCH_2Ph	Ms	H
	i-Pr	H	$\text{OCH}(\text{CH}_3)_2$	$\text{COOCH}_2\text{CH}=\text{CH}_2$	Ms	H
	i-Pr	H	$\text{OCH}(\text{CH}_3)_2$	$\text{COOCH}_2\text{C}\equiv\text{CH}$	Ms	H
10	i-Pr	H	CH_2OCH_3	COOMe	Ms	H
	i-Pr	H	CH_2OCH_3	COOMe	Cl	H
	i-Pr	H	CH_2OCH_3	COOEt	Ms	H
	i-Pr	H	CH_2OCH_3	COOEt	Cl	H
15	i-Pr	H	CH_2OCH_3	$\text{COOCH}(\text{CH}_3)_2$	Ms	H
	i-Pr	H	CH_2OCH_3	$\text{COOCH}(\text{CH}_3)_2$	Cl	H
	i-Pr	H	CH_2OCH_3	$\text{CON}(\text{CH}_3)_2$	Ms	H
	i-Pr	H	CH_2OCH_3	$\text{CON}(\text{CH}_3)_2$	Cl	H
	i-Pr	H	CH_2OCH_3	CONHMe	Ms	H
20	i-Pr	H	CH_2OCH_3	CONHEt	Ms	H
	i-Pr	H	CH_2OCH_3	CONHC_3H_7	Ms	H
	i-Pr	H	CH_2OCH_3	$\text{CONHCH}(\text{CH}_3)_2$	Ms	H
	i-Pr	H	CH_2OCH_3	$\text{CONHC}(\text{CH}_3)_3$	Ms	H
	i-Pr	H	CH_2OCH_3	CONEt_2	Ms	H
25	i-Pr	H	CH_2OCH_3	$\text{CONHC}(\text{CH}_3)_3$	Ms	H
	i-Pr	H	CH_2OCH_3	CONHC_4H_9	Ms	H
	i-Pr	H	CH_2OCH_3	CONHC_4H_9	Ms	H
	i-Pr	H	CH_2OCH_3	$\text{CON}(\text{CH}(\text{CH}_3)_2)_2$	Ms	H
30	i-Pr	H	CH_2OCH_3	Y1	Ms	H
	i-Pr	H	CH_2OCH_3	Y2	Ms	H
	i-Pr	H	CH_2OCH_3	COOPh	Ms	H
	i-Pr	H	CH_2OCH_3	COOCH_2Ph	Ms	H
	i-Pr	H	CH_2OCH_3	$\text{COOCH}_2\text{CH}=\text{CH}_2$	Ms	H
35	i-Pr	H	CH_2OCH_3	$\text{COOCH}_2\text{C}\equiv\text{CH}$	Ms	H
	Me	H	NO_2	COOMe	Ms	H
	Me	H	NO_2	COOEt	Ms	H
	Me	H	NO_2	$\text{COOCH}(\text{CH}_3)_2$	Ms	H
40	Me	H	NO_2	CONMe_2	Ms	H
	Me	H	NO_2	CONEt_2	Ms	H
	Me	H	NO_2	COOC_3H_7	Ms	H
	Me	H	NO_2	Y1	Ms	H
	Me	H	NO_2	Y2	Ms	H
45	Me	H	NO_2	Y3	Ms	H
	Me	H	NO_2	COOPh	Ms	H
	Me	H	NO_2	COOCH_2Ph	Ms	H
	Me	H	NO_2	$\text{COOCH}_2\text{CH}=\text{CH}_2$	Ms	H

50

55

	A	B	X	Y	Z	Q
5	Me	H	CF ₃	COOMe	Ms	H
	Me	H	CF ₃	COOEt	Ms	H
	Me	H	CF ₃	COOCH(CH ₃) ₂	Ms	H
10	Me	H	CF ₃	CONMe ₂	Ms	H
	Me	H	CF ₃	CONEt ₂	Ms	H
	Me	H	CF ₃	COOC ₃ H ₇	Ms	H
	Me	H	CF ₃	Y1	Ms	H
	Me	H	CF ₃	Y2	Ms	H
15	Me	H	CF ₃	Y3	Ms	H
	Me	H	CF ₃	COOPh	Ms	H
	Me	H	CF ₃	COOCH ₂ Ph	Ms	H
	Me	H	CF ₃	COOCH ₂ CH=CH ₂	Ms	H
20	Me	H	CN	COOMe	Ms	H
	Me	H	CN	COOEt	Ms	H
	Me	H	CN	COOCH(CH ₃) ₂	Ms	H
	Me	H	CN	CONMe ₂	Ms	H
	Me	H	CN	CONEt ₂	Ms	H
25	Me	H	CN	COOC ₃ H ₇	Ms	H
	Me	H	CN	Y1	Ms	H
	Me	H	CN	Y2	Ms	H
	Me	H	CN	Y3	Ms	H
	Me	H	CN	COOPh	Ms	H
30	Me	H	CN	COOCH ₂ Ph	Ms	H
	Me	H	CN	COOCH ₂ CH=CH ₂	Ms	H
	Me	H	CH ₂ OEt	COOMe	Ms	H
	Me	H	CH ₂ OEt	COOEt	Ms	H
35	Me	H	CH ₂ OEt	COOCH(CH ₃) ₂	Ms	H
	Me	H	CH ₂ OEt	CONMe ₂	Ms	H
	Me	H	CH ₂ OEt	CONEt ₂	Ms	H
	Me	H	CH ₂ OEt	COOC ₃ H ₇	Ms	H
	Me	H	CH ₂ OEt	Y1	Ms	H
40	Me	H	CH ₂ OEt	Y2	Ms	H
	Me	H	CH ₂ OEt	Y3	Ms	H
	Me	H	CH ₂ OEt	COOPh	Ms	H
	Me	H	CH ₂ OEt	COOCH ₂ Ph	Ms	H
	Me	H	CH ₂ OEt	COOCH ₂ CH=CH ₂	Ms	H
45	Me	H	Et	COOMe	Ms	H
	Me	H	Et	COOEt	Ms	H
	Me	H	Et	COOCH(CH ₃) ₂	Ms	H
	Me	H	Et	CONMe ₂	Ms	H
50						
55						

	A	B	X	Y	Z	Q
5	Me	H	Et	CONEt ₂	Ms	H
	Me	H	Et	COOC ₃ H ₇	Ms	H
	Me	H	Et	Y1	Ms	H
10	Me	H	Et	Y2	Ms	H
	Me	H	Et	Y3	Ms	H
	Me	H	Et	COOPh	Ms	H
	Me	H	Et	COOCH ₂ Ph	Ms	H
	Me	H	Et	COOCH ₂ CH=CH ₂	Ms	H
15	Me	H	i-Pr	COOMe	Ms	H
	Me	H	i-Pr	COOEt	Ms	H
	Me	H	i-Pr	COOCH(CH ₃) ₂	Ms	H
	Me	H	i-Pr	CONMe ₂	Ms	H
20	Me	H	i-Pr	CONEt ₂	Ms	H
	Me	H	i-Pr	COOC ₃ H ₇	Ms	H
	Me	H	i-Pr	Y1	Ms	H
	Me	H	i-Pr	Y2	Ms	H
	Me	H	i-Pr	Y3	Ms	H
25	Me	H	i-Pr	COOPh	Ms	H
	Me	H	i-Pr	COOCH ₂ Ph	Ms	H
	Me	H	i-Pr	COOCH ₂ CH=CH ₂	Ms	H
	Me	H	n-Pr	COOMe	Ms	H
	Me	H	n-Pr	COOEt	Ms	H
30	Me	H	n-Pr	COOCH(CH ₃) ₂	Ms	H
	Me	H	n-Pr	CONMe ₂	Ms	H
	Me	H	n-Pr	CONEt ₂	Ms	H
	Me	H	n-Pr	COOC ₃ H ₇	Ms	H
35	Me	H	n-Pr	Y1	Ms	H
	Me	H	n-Pr	Y2	Ms	H
	Me	H	n-Pr	Y3	Ms	H
	Me	H	n-Pr	COOPh	Ms	H
	Me	H	n-Pr	COOCH ₂ Ph	Ms	H
40	Me	H	n-Pr	COOCH ₂ CH=CH ₂	Ms	H
	Me	H	I	COOMe	Ms	H
	Me	H	I	COOEt	Ms	H
	Me	H	I	COOCH(CH ₃) ₂	Ms	H
	Me	H	I	CONMe ₂	Ms	H
45	Me	H	I	CONEt ₂	Ms	H
	Me	H	I	COOC ₃ H ₇	Ms	H
	Me	H	I	Y1	Ms	H
	Me	H	I	Y2	Ms	H
50						
55						

	A	B	X	Y	Z	Q
5	Me	H	I	Y3	Ms	H
	Me	H	I	COOPh	Ms	H
	Me	H	I	COOCH ₂ Ph	Ms	H
	Me	H	I	COOCH ₂ CH=CH ₂	Ms	H
10	Et	H	NO ₂	COOMe	Ms	H
	Et	H	NO ₂	COOEt	Ms	H
	Et	H	NO ₂	COOCH(CH ₃) ₂	Ms	H
	Et	H	NO ₂	CONMe ₂	Ms	H
15	Et	H	NO ₂	CONEt ₂	Ms	H
	Et	H	NO ₂	COOC ₃ H ₇	Ms	H
	Et	H	NO ₂	Y1	Ms	H
	Et	H	NO ₂	Y2	Ms	H
	Et	H	NO ₂	Y3	Ms	H
20	Et	H	NO ₂	COOPh	Ms	H
	Et	H	NO ₂	COOCH ₂ Ph	Ms	H
	Et	H	NO ₂	COOCH ₂ CH=CH ₂	Ms	H
	Et	H	CF ₃	COOMe	Ms	H
25	Et	H	CF ₃	COOEt	Ms	H
	Et	H	CF ₃	COOCH(CH ₃) ₂	Ms	H
	Et	H	CF ₃	CONMe ₂	Ms	H
	Et	H	CF ₃	CONEt ₂	Ms	H
	Et	H	CF ₃	COOC ₃ H ₇	Ms	H
30	Et	H	CF ₃	Y1	Ms	H
	Et	H	CF ₃	Y2	Ms	H
	Et	H	CF ₃	Y3	Ms	H
	Et	H	CF ₃	COOPh	Ms	H
	Et	H	CF ₃	COOCH ₂ Ph	Ms	H
35	Et	H	CF ₃	COOCH ₂ CH=CH ₂	Ms	H
	Et	H	CN	COOMe	Ms	H
	Et	H	CN	COOEt	Ms	H
	Et	H	CN	COOCH(CH ₃) ₂	Ms	H
40	Et	H	CN	CONMe ₂	Ms	H
	Et	H	CN	CONEt ₂	Ms	H
	Et	H	CN	COOC ₃ H ₇	Ms	H
	Et	H	CN	Y1	Ms	H
	Et	H	CN	Y2	Ms	H
45	Et	H	CN	Y3	Ms	H
	Et	H	CN	COOPh	Ms	H
	Et	H	CN	COOCH ₂ Ph	Ms	H
	Et	H	CN	COOCH ₂ CH=CH ₂	Ms	H

50

55

	A	B	X	Y	Z	Q
5	Et	H	CH ₂ OEt	COOMe	Ms	H
	Et	H	CH ₂ OEt	COOEt	Ms	H
	Et	H	CH ₂ OEt	COOCH(CH ₃) ₂	Ms	H
	Et	H	CH ₂ OEt	CONMe ₂	Ms	H
10	Et	H	CH ₂ OEt	CONEt ₂	Ms	H
	Et	H	CH ₂ OEt	COOC ₃ H ₇	Ms	H
	Et	H	CH ₂ OEt	Y1	Ms	H
	Et	H	CH ₂ OEt	Y2	Ms	H
	Et	H	CH ₂ OEt	Y3	Ms	H
15	Et	H	CH ₂ OEt	COOPh	Ms	H
	Et	H	CH ₂ OEt	COOCH ₂ Ph	Ms	H
	Et	H	CH ₂ OEt	COOCH ₂ CH=CH ₂	Ms	H
	Et	H	Et	COOMe	Ms	H
20	Et	H	Et	COOEt	Ms	H
	Et	H	Et	COOCH(CH ₃) ₂	Ms	H
	Et	H	Et	CONMe ₂	Ms	H
	Et	H	Et	CONEt ₂	Ms	H
	Et	H	Et	COOC ₃ H ₇	Ms	H
25	Et	H	Et	Y1	Ms	H
	Et	H	Et	Y2	Ms	H
	Et	H	Et	Y3	Ms	H
	Et	H	Et	COOPh	Ms	H
	Et	H	Et	COOCH ₂ Ph	Ms	H
30	Et	H	Et	COOCH ₂ CH=CH ₂	Ms	H
	Et	H	i-Pr	COOMe	Ms	H
	Et	H	i-Pr	COOEt	Ms	H
	Et	H	i-Pr	COOCH(CH ₃) ₂	Ms	H
35	Et	H	i-Pr	CONMe ₂	Ms	H
	Et	H	i-Pr	CONEt ₂	Ms	H
	Et	H	i-Pr	COOC ₃ H ₇	Ms	H
	Et	H	i-Pr	Y1	Ms	H
	Et	H	i-Pr	Y2	Ms	H
40	Et	H	i-Pr	Y3	Ms	H
	Et	H	i-Pr	COOPh	Ms	H
	Et	H	i-Pr	COOCH ₂ Ph	Ms	H
	Et	H	i-Pr	COOCH ₂ CH=CH ₂	Ms	H
45	Et	H	n-Pr	COOMe	Ms	H
	Et	H	n-Pr	COOEt	Ms	H
	Et	H	n-Pr	COOCH(CH ₃) ₂	Ms	H
	Et	H	n-Pr	CONMe ₂	Ms	H

50

55

	A	B	X	Y	Z	Q
5	Et	H	n-Pr	CONEt ₂	Ms	H
	Et	H	n-Pr	COOC ₃ H ₇	Ms	H
	Et	H	n-Pr	Y1	Ms	H
	Et	H	n-Pr	Y2	Ms	H
10	Et	H	n-Pr	Y3	Ms	H
	Et	H	n-Pr	COOPh	Ms	H
	Et	H	n-Pr	COOCH ₂ Ph	Ms	H
	Et	H	n-Pr	COOCH ₂ CH=CH ₂	Ms	H
15	Et	H	I	COOMe	Ms	H
	Et	H	I	COOEt	Ms	H
	Et	H	I	COOCH(CH ₃) ₂	Ms	H
	Et	H	I	CONMe ₂	Ms	H
	Et	H	I	CONEt ₂	Ms	H
20	Et	H	I	COOC ₃ H ₇	Ms	H
	Et	H	I	Y1	Ms	H
	Et	H	I	Y2	Ms	H
	Et	H	I	Y3	Ms	H
	Et	H	I	COOPh	Ms	H
25	Et	H	I	COOCH ₂ Ph	Ms	H
	Et	H	I	COOCH ₂ CH=CH ₂	Ms	H
	i-Pr	H	NO ₂	COOMe	Ms	H
	i-Pr	H	NO ₂	COOEt	Ms	H
30	i-Pr	H	NO ₂	COOCH(CH ₃) ₂	Ms	H
	i-Pr	H	NO ₂	CONMe ₂	Ms	H
	i-Pr	H	NO ₂	CONEt ₂	Ms	H
	i-Pr	H	NO ₂	COOC ₃ H ₇	Ms	H
	i-Pr	H	NO ₂	Y1	Ms	H
35	i-Pr	H	NO ₂	Y2	Ms	H
	i-Pr	H	NO ₂	Y3	Ms	H
	i-Pr	H	NO ₂	COOPh	Ms	H
	i-Pr	H	NO ₂	COOCH ₂ Ph	Ms	H
40	i-Pr	H	NO ₂	COOCH ₂ CH=CH ₂	Ms	H
	i-Pr	H	CF ₃	COOMe	Ms	H
	i-Pr	H	CF ₃	COOEt	Ms	H
	i-Pr	H	CF ₃	COOCH(CH ₃) ₂	Ms	H
	i-Pr	H	CF ₃	CONMe ₂	Ms	H
45	i-Pr	H	CF ₃	CONEt ₂	Ms	H
	i-Pr	H	CF ₃	COOC ₃ H ₇	Ms	H
	i-Pr	H	CF ₃	Y1	Ms	H
	i-Pr	H	CF ₃	Y2	Ms	H
50						
55						

	A	B	X	Y	Z	Q
5	i-Pr	H	CF ₃	Y3	Ms	H
	i-Pr	H	CF ₃	COOPh	Ms	H
	i-Pr	H	CF ₃	COOCH ₂ Ph	Ms	H
	i-Pr	H	CF ₃	COOCH ₂ CH=CH ₂	Ms	H
10	i-Pr	H	CN	COOMe	Ms	H
	i-Pr	H	CN	COOEt	Ms	H
	i-Pr	H	CN	COOCH(CH ₃) ₂	Ms	H
	i-Pr	H	CN	CONMe ₂	Ms	H
15	i-Pr	H	CN	CONEt ₂	Ms	H
	i-Pr	H	CN	COOC ₃ H ₇	Ms	H
	i-Pr	H	CN	Y1	Ms	H
	i-Pr	H	CN	Y2	Ms	H
	i-Pr	H	CN	Y3	Ms	H
20	i-Pr	H	CN	COOPh	Ms	H
	i-Pr	H	CN	COOCH ₂ Ph	Ms	H
	i-Pr	H	CN	COOCH ₂ CH=CH ₂	Ms	H
	i-Pr	H	CH ₂ OEt	COOMe	Ms	H
25	i-Pr	H	CH ₂ OEt	COOEt	Ms	H
	i-Pr	H	CH ₂ OEt	COOCH(CH ₃) ₂	Ms	H
	i-Pr	H	CH ₂ OEt	CONMe ₂	Ms	H
	i-Pr	H	CH ₂ OEt	CONEt ₂	Ms	H
	i-Pr	H	CH ₂ OEt	COOC ₃ H ₇	Ms	H
30	i-Pr	H	CH ₂ OEt	Y1	Ms	H
	i-Pr	H	CH ₂ OEt	Y2	Ms	H
	i-Pr	H	CH ₂ OEt	Y3	Ms	H
	i-Pr	H	CH ₂ OEt	COOPh	Ms	H
	i-Pr	H	CH ₂ OEt	COOCH ₂ Ph	Ms	H
35	i-Pr	H	CH ₂ OEt	COOCH ₂ CH=CH ₂	Ms	H
	i-Pr	H	Et	COOMe	Ms	H
	i-Pr	H	Et	COOEt	Ms	H
	i-Pr	H	Et	COOCH(CH ₃) ₂	Ms	H
40	i-Pr	H	Et	CONMe ₂	Ms	H
	i-Pr	H	Et	CONEt ₂	Ms	H
	i-Pr	H	Et	COOC ₃ H ₇	Ms	H
	i-Pr	H	Et	Y1	Ms	H
	i-Pr	H	Et	Y2	Ms	H
45	i-Pr	H	Et	Y3	Ms	H
	i-Pr	H	Et	COOPh	Ms	H
	i-Pr	H	Et	COOCH ₂ Ph	Ms	H
	i-Pr	H	Et	COOCH ₂ CH=CH ₂	Ms	H
50						
55						

	A	B	X	Y	Z	Q
5	i-Pr	H	i-Pr	COOMe	Ms	H
	i-Pr	H	i-Pr	COOEt	Ms	H
	i-Pr	H	i-Pr	COOCH(CH ₃) ₂	Ms	H
	i-Pr	H	i-Pr	CONMe ₂	Ms	H
10	i-Pr	H	i-Pr	CONEt ₂	Ms	H
	i-Pr	H	i-Pr	COOC ₃ H ₇	Ms	H
	i-Pr	H	i-Pr	Y1	Ms	H
	i-Pr	H	i-Pr	Y2	Ms	H
	i-Pr	H	i-Pr	Y3	Ms	H
15	i-Pr	H	i-Pr	COOPh	Ms	H
	i-Pr	H	i-Pr	COOCH ₂ Ph	Ms	H
	i-Pr	H	i-Pr	COOCH ₂ CH=CH ₂	Ms	H
	i-Pr	H	n-Pr	COOMe	Ms	H
20	i-Pr	H	n-Pr	COOEt	Ms	H
	i-Pr	H	n-Pr	COOCH(CH ₃) ₂	Ms	H
	i-Pr	H	n-Pr	CONMe ₂	Ms	H
	i-Pr	H	n-Pr	CONEt ₂	Ms	H
	i-Pr	H	n-Pr	COOC ₃ H ₇	Ms	H
25	i-Pr	H	n-Pr	Y1	Ms	H
	i-Pr	H	n-Pr	Y2	Ms	H
	i-Pr	H	n-Pr	Y3	Ms	H
	i-Pr	H	n-Pr	COOPh	Ms	H
	i-Pr	H	n-Pr	COOCH ₂ Ph	Ms	H
30	i-Pr	H	n-Pr	COOCH ₂ CH=CH ₂	Ms	H
	i-Pr	H	I	COOMe	Ms	H
	i-Pr	H	I	COOEt	Ms	H
	i-Pr	H	I	COOCH(CH ₃) ₂	Ms	H
35	i-Pr	H	I	CONMe ₂	Ms	H
	i-Pr	H	I	CONEt ₂	Ms	H
	i-Pr	H	I	COOC ₃ H ₇	Ms	H
	i-Pr	H	I	Y1	Ms	H
	i-Pr	H	I	Y2	Ms	H
40	i-Pr	H	I	Y3	Ms	H
	i-Pr	H	I	COOPh	Ms	H
	i-Pr	H	I	COOCH ₂ Ph	Ms	H
	i-Pr	H	I	COOCH ₂ CH=CH ₂	Ms	H
45	allyl	H	NO ₂	COOMe	Ms	H
	allyl	H	NO ₂	COOEt	Ms	H
	allyl	H	NO ₂	COOCH(CH ₃) ₂	Ms	H
	allyl	H	NO ₂	CONMe ₂	Ms	H

50

55

	A	B	X	Y	Z	Q
5	allyl	H	NO ₂	CONEt ₂	Ms	H
	allyl	H	NO ₂	COOC ₃ H ₇	Ms	H
	allyl	H	NO ₂	Y1	Ms	H
10	allyl	H	NO ₂	Y2	Ms	H
	allyl	H	NO ₂	Y3	Ms	H
	allyl	H	NO ₂	COOPh	Ms	H
	allyl	H	NO ₂	COOCH ₂ Ph	Ms	H
	allyl	H	NO ₂	COOCH ₂ CH=CH ₂	Ms	H
15	allyl	H	CF ₃	COOMe	Ms	H
	allyl	H	CF ₃	COOEt	Ms	H
	allyl	H	CF ₃	COOCH(CH ₃) ₂	Ms	H
	allyl	H	CF ₃	CONMe ₂	Ms	H
20	allyl	H	CF ₃	CONEt ₂	Ms	H
	allyl	H	CF ₃	COOC ₃ H ₇	Ms	H
	allyl	H	CF ₃	Y1	Ms	H
	allyl	H	CF ₃	Y2	Ms	H
	allyl	H	CF ₃	Y3	Ms	H
25	allyl	H	CF ₃	COOPh	Ms	H
	allyl	H	CF ₃	COOCH ₂ Ph	Ms	H
	allyl	H	CF ₃	COOCH ₂ CH=CH ₂	Ms	H
	allyl	H	CN	COOMe	Ms	H
	allyl	H	CN	COOEt	Ms	H
30	allyl	H	CN	COOCH(CH ₃) ₂	Ms	H
	allyl	H	CN	CONMe ₂	Ms	H
	allyl	H	CN	CONEt ₂	Ms	H
	allyl	H	CN	COOC ₃ H ₇	Ms	H
35	allyl	H	CN	Y1	Ms	H
	allyl	H	CN	Y2	Ms	H
	allyl	H	CN	Y3	Ms	H
	allyl	H	CN	COOPh	Ms	H
	allyl	H	CN	COOCH ₂ Ph	Ms	H
40	allyl	H	CN	COOCH ₂ CH=CH ₂	Ms	H
	allyl	H	CH ₂ OEt	COOMe	Ms	H
	allyl	H	CH ₂ OEt	COOEt	Ms	H
	allyl	H	CH ₂ OEt	COOCH(CH ₃) ₂	Ms	H
	allyl	H	CH ₂ OEt	CONMe ₂	Ms	H
45	allyl	H	CH ₂ OEt	CONEt ₂	Ms	H
	allyl	H	CH ₂ OEt	COOC ₃ H ₇	Ms	H
	allyl	H	CH ₂ OEt	Y1	Ms	H
	allyl	H	CH ₂ OEt	Y2	Ms	H

50

55

	A	B	X	Y	Z	Q
5	allyl	H	CH ₂ OEt	Y3	Ms	H
	allyl	H	CH ₂ OEt	COOPh	Ms	H
	allyl	H	CH ₂ OEt	COOCH ₂ Ph	Ms	H
10	allyl	H	CH ₂ OEt	COOCH ₂ CH=CH ₂	Ms	H
	allyl	H	Et	COOMe	Ms	H
	allyl	H	Et	COOEt	Ms	H
	allyl	H	Et	COOCH(CH ₃) ₂	Ms	H
	allyl	H	Et	CONMe ₂	Ms	H
15	allyl	H	Et	CONEt ₂	Ms	H
	allyl	H	Et	COOC ₃ H ₇	Ms	H
	allyl	H	Et	Y1	Ms	H
	allyl	H	Et	Y2	Ms	H
	allyl	H	Et	Y3	Ms	H
20	allyl	H	Et	COOPh	Ms	H
	allyl	H	Et	COOCH ₂ Ph	Ms	H
	allyl	H	Et	COOCH ₂ CH=CH ₂	Ms	H
	allyl	H	i-Pr	COOMe	Ms	H
25	allyl	H	i-Pr	COOEt	Ms	H
	allyl	H	i-Pr	COOCH(CH ₃) ₂	Ms	H
	allyl	H	i-Pr	CONMe ₂	Ms	H
	allyl	H	i-Pr	CONEt ₂	Ms	H
	allyl	H	i-Pr	COOC ₃ H ₇	Ms	H
30	allyl	H	i-Pr	Y1	Ms	H
	allyl	H	i-Pr	Y2	Ms	H
	allyl	H	i-Pr	Y3	Ms	H
	allyl	H	i-Pr	COOPh	Ms	H
	allyl	H	i-Pr	COOCH ₂ Ph	Ms	H
35	allyl	H	i-Pr	COOCH ₂ CH=CH ₂	Ms	H
	allyl	H	n-Pr	COOMe	Ms	H
	allyl	H	n-Pr	COOEt	Ms	H
	allyl	H	n-Pr	COOCH(CH ₃) ₂	Ms	H
40	allyl	H	n-Pr	CONMe ₂	Ms	H
	allyl	H	n-Pr	CONEt ₂	Ms	H
	allyl	H	n-Pr	COOC ₃ H ₇	Ms	H
	allyl	H	n-Pr	Y1	Ms	H
	allyl	H	n-Pr	Y2	Ms	H
45	allyl	H	n-Pr	Y3	Ms	H
	allyl	H	n-Pr	COOPh	Ms	H
	allyl	H	n-Pr	COOCH ₂ Ph	Ms	H
	allyl	H	n-Pr	COOCH ₂ CH=CH ₂	Ms	H

50

55

	A	B	X	Y	Z	Q
5	allyl	H	I	COOMe	Ms	H
	allyl	H	I	COOEt	Ms	H
	allyl	H	I	COOCH(CH ₃) ₂	Ms	H
	allyl	H	I	CONMe ₂	Ms	H
	allyl	H	I	CONEt ₂	Ms	H
10	allyl	H	I	COOC ₃ H ₇	Ms	H
	allyl	H	I	Y1	Ms	H
	allyl	H	I	Y2	Ms	H
	allyl	H	I	Y3	Ms	H
15	allyl	H	I	COOPh	Ms	H
	allyl	H	I	COOCH ₂ Ph	Ms	H
	allyl	H	I	COOCH ₂ CH=CH ₂	Ms	H
	allyl	H	Me	COOH	Ms	H
	allyl	H	Cl	COOH	Ms	H
20	Me	H	Me	COOH	Ms	H
	Me	H	Cl	COOH	Ms	H
	Et	H	Me	COOH	Ms	H
	Et	H	Cl	COOH	Ms	H
	i-Pr	H	Me	COOH	Ms	H
25	i-Pr	H	Cl	COOH	Ms	H

30

35

40

45

50

55

	A	B	X	Y	Z	Q
5	Me	H	COOMe	$\text{CH}_2\text{OCH}_2\text{CH}=\text{CH}_2$	Ms	H
	Me	H	COOMe	$\text{CH}_2\text{OCH}_2\text{C}\equiv\text{CH}$	Ms	H
	Me	H	COOMe	SCH_3	Ms	H
	Me	H	COOMe	CH_2OH	Ms	H
10	Me	H	COOMe	CH_2SCH_3	Ms	H
	Et	H	COOMe	$\text{CH}_2\text{OCH}_2\text{CH}=\text{CH}_2$	Ms	H
	Et	H	COOMe	$\text{CH}_2\text{OCH}_2\text{C}\equiv\text{CH}$	Ms	H
	Et	H	COOMe	SCH_3	Ms	H
15	Et	H	COOMe	CH_2OH	Ms	H
	Et	H	COOMe	CH_2SCH_3	Ms	H
	i-Pr	H	COOMe	$\text{CH}_2\text{OCH}_2\text{CH}=\text{CH}_2$	Ms	H
	i-Pr	H	COOMe	$\text{CH}_2\text{OCH}_2\text{C}\equiv\text{CH}$	Ms	H
	i-Pr	H	COOMe	SCH_3	Ms	H
20	i-Pr	H	COOMe	CH_2OH	Ms	H
	i-Pr	H	COOMe	CH_2SCH_3	Ms	H
	Me	H	COOEt	$\text{CH}_2\text{OCH}_2\text{CH}=\text{CH}_2$	Ms	H
	Me	H	COOEt	$\text{CH}_2\text{OCH}_2\text{C}\equiv\text{CH}$	Ms	H
25	Me	H	COOEt	SCH_3	Ms	H
	Me	H	COOEt	CH_2OH	Ms	H
	Me	H	COOEt	CH_2SCH_3	Ms	H
	Et	H	COOEt	$\text{CH}_2\text{OCH}_2\text{CH}=\text{CH}_2$	Ms	H
	Et	H	COOEt	$\text{CH}_2\text{OCH}_2\text{C}\equiv\text{CH}$	Ms	H
30	Et	H	COOEt	SCH_3	Ms	H
	Et	H	COOEt	CH_2OH	Ms	H
	Et	H	COOEt	CH_2SCH_3	Ms	H
	i-Pr	H	COOEt	$\text{CH}_2\text{OCH}_2\text{CH}=\text{CH}_2$	Ms	H
	i-Pr	H	COOEt	$\text{CH}_2\text{OCH}_2\text{C}\equiv\text{CH}$	Ms	H
35	i-Pr	H	COOEt	SCH_3	Ms	H
	i-Pr	H	COOEt	CH_2OH	Ms	H
	i-Pr	H	COOEt	CH_2SCH_3	Ms	H
	Me	H	Me	COOY4	Ms	H
40	Me	H	Me	COOY5	Ms	H
	Me	H	Me	COOY6	Ms	H
	Me	H	Me	$\text{COOCH}_2\text{CH}_2\text{Cl}$	Ms	H
	Me	H	Me	$\text{COOCH}_2\text{CF}_3$	Ms	H
	Me	H	Me	$\text{COOCH}_2\text{CCl}=\text{CH}_2$	Ms	H
45	Me	H	Me	$\text{COOCH}_2\text{CH}_2\text{OCH}_3$	Ms	H
	Me	H	Me	$\text{COOCH}_2\text{SCH}_3$	Ms	H
	Me	H	Me	$\text{COOCH}_2\text{CH}_2\text{OCH}_2\text{CH}_2\text{Cl}$	Ms	H
	Me	H	Me	$\text{COOCH}_2\text{CH}_2\text{OMs}$	Ms	H

50

55

	A	B	X	Y	Z	Q
5	Me	H	Me	COOCH ₂ OCH ₂ CH ₂ OCH ₃	Ms	H
	Me	H	Me	COOCH ₂ CH ₂ Ms	Ms	H
	Me	H	Me	COOCH ₂ CH ₂ CN	Ms	H
	Me	H	Me	COOCH ₂ CH ₂ NHCH ₃	Ms	H
10	Me	H	Me	COOCH ₂ CH ₂ OH	Ms	H
	Me	H	Me	COOCH ₂ CH ₂ CH ₂ NO ₂	Ms	H
	Me	H	Me	COOY7	Ms	H
	Me	H	Me	COOCH ₂ COCH ₃	Ms	H
	Me	H	Me	COOCH ₂ CO ₂ CH ₃	Ms	H
15	Me	H	Me	COOCH(CH ₃)COOEt	Ms	H
	Me	H	Me	COOCH ₂ CH ₂ OPh	Ms	H
	Me	H	Me	COOCH ₂ CH ₂ OCH ₂ Ph	Ms	H
	Me	H	Me	COOPh-4-CH ₃	Ms	H
20	Me	H	Me	COOPh-4-Cl	Ms	H
	Me	H	Me	COOPh-4-NO ₂	Ms	H
	Me	H	Me	COOCH ₂ SiMe ₃	Ms	H
	Me	H	Me	COOY8	Ms	H
	Me	H	Me	COOCH ₂ Y8	Ms	H
25	Me	H	Me	COOY9	Ms	H
	Me	H	Me	COOY10	Ms	H
	Me	H	Me	CONHSO ₂ CH ₃	Ms	H
	Me	H	Me	CONHSO ₂ CF ₃	Ms	H
30	Me	H	Cl	COOY4	Ms	H
	Me	H	Cl	COOY5	Ms	H
	Me	H	Cl	COOY6	Ms	H
	Me	H	Cl	COOCH ₂ CH ₂ Cl	Ms	H
	Me	H	Cl	COOCH ₂ CF ₃	Ms	H
35	Me	H	Cl	COOCH ₂ CCl=CH ₂	Ms	H
	Me	H	Cl	COOCH ₂ CH ₂ OCH ₃	Ms	H
	Me	H	Cl	COOCH ₂ SCH ₃	Ms	H
	Me	H	Cl	COOCH ₂ CH ₂ OCH ₂ CH ₂ Cl	Ms	H
	Me	H	Cl	COOCH ₂ CH ₂ OMs	Ms	H
40	Me	H	Cl	COOCH ₂ OCH ₂ CH ₂ OCH ₃	Ms	H
	Me	H	Cl	COOCH ₂ CH ₂ Ms	Ms	H
	Me	H	Cl	COOCH ₂ CH ₂ CN	Ms	H
	Me	H	Cl	COOCH ₂ CH ₂ NHCH ₃	Ms	H
45	Me	H	Cl	COOCH ₂ CH ₂ OH	Ms	H
	Me	H	Cl	COOCH ₂ CH ₂ CH ₂ NO ₂	Ms	H
	Me	H	Cl	COOY7	Ms	H
	Me	H	Cl	COOCH ₂ COCH ₃	Ms	H

50

55

	A	B	X	Y	Z	Q
5	Me	H	Cl	COOCH ₂ CO ₂ CH ₃	Ms	H
	Me	H	Cl	COOCH(CH ₃)COOEt	Ms	H
	Me	H	Cl	COOCH ₂ CH ₂ OPh	Ms	H
10	Me	H	Cl	COOCH ₂ CH ₂ OCH ₂ Ph	Ms	H
	Me	H	Cl	COOPh-4-CH ₃	Ms	H
	Me	H	Cl	COOPh-4-Cl	Ms	H
	Me	H	Cl	COOPh-4-NO ₂	Ms	H
	Me	H	Cl	COOCH ₂ SiMe ₃	Ms	H
15	Me	H	Cl	COOY8	Ms	H
	Me	H	Cl	COOCH ₂ Y8	Ms	H
	Me	H	Cl	COOY9	Ms	H
	Me	H	Cl	COOY10	Ms	H
	Me	H	Cl	CONHSO ₂ CH ₃	Ms	H
20	Me	H	Cl	CONHSO ₂ CF ₃	Ms	H
	Me	H	OMe	COOY4	Ms	H
	Me	H	OMe	COOY5	Ms	H
	Me	H	OMe	COOY6	Ms	H
25	Me	H	OMe	COOCH ₂ CH ₂ Cl	Ms	H
	Me	H	OMe	COOCH ₂ CF ₃	Ms	H
	Me	H	OMe	COOCH ₂ CCl=CH ₂	Ms	H
	Me	H	OMe	COOCH ₂ CH ₂ OCH ₃	Ms	H
	Me	H	OMe	COOCH ₂ SCH ₃	Ms	H
30	Me	H	OMe	COOCH ₂ CH ₂ OCH ₂ CH ₂ Cl	Ms	H
	Me	H	OMe	COOCH ₂ CH ₂ OMs	Ms	H
	Me	H	OMe	COOCH ₂ OCH ₂ CH ₂ OCH ₃	Ms	H
	Me	H	OMe	COOCH ₂ CH ₂ Ms	Ms	H
	Me	H	OMe	COOCH ₂ CH ₂ CN	Ms	H
35	Me	H	OMe	COOCH ₂ CH ₂ NHCH ₃	Ms	H
	Me	H	OMe	COOCH ₂ CH ₂ OH	Ms	H
	Me	H	OMe	COOCH ₂ CH ₂ CH ₂ NO ₂	Ms	H
	Me	H	OMe	COOY7	Ms	H
40	Me	H	OMe	COOCH ₂ COCH ₃	Ms	H
	Me	H	OMe	COOCH ₂ CO ₂ CH ₃	Ms	H
	Me	H	OMe	COOCH(CH ₃)COOEt	Ms	H
	Me	H	OMe	COOCH ₂ CH ₂ OPh	Ms	H
	Me	H	OMe	COOCH ₂ CH ₂ OCH ₂ Ph	Ms	H
45	Me	H	OMe	COOPh-4-CH ₃	Ms	H
	Me	H	OMe	COOPh-4-Cl	Ms	H
	Me	H	OMe	COOPh-4-NO ₂	Ms	H
	Me	H	OMe	COOCH ₂ SiMe ₃	Ms	H
50						
55						

	A	B	X	Y	Z	Q
5	Me	H	OMe	COOY8	Ms	H
	Me	H	OMe	COOCH ₂ Y8	Ms	H
	Me	H	OMe	COOY9	Ms	H
	Me	H	OMe	COOY10	Ms	H
10	Me	H	OMe	CONHSO ₂ CH ₃	Ms	H
	Me	H	OMe	CONHSO ₂ CF ₃	Ms	H
	Et	H	Me	COOY4	Ms	H
	Et	H	Me	COOY5	Ms	H
15	Et	H	Me	COOY6	Ms	H
	Et	H	Me	COOCH ₂ CH ₂ Cl	Ms	H
	Et	H	Me	COOCH ₂ CF ₃	Ms	H
	Et	H	Me	COOCH ₂ CCl=CH ₂	Ms	H
	Et	H	Me	COOCH ₂ CH ₂ OCH ₃	Ms	H
20	Et	H	Me	COOCH ₂ SCH ₃	Ms	H
	Et	H	Me	COOCH ₂ CH ₂ OCH ₂ CH ₂ Cl	Ms	H
	Et	H	Me	COOCH ₂ CH ₂ OMs	Ms	H
	Et	H	Me	COOCH ₂ OCH ₂ CH ₂ OCH ₃	Ms	H
25	Et	H	Me	COOCH ₂ CH ₂ Ms	Ms	H
	Et	H	Me	COOCH ₂ CH ₂ CN	Ms	H
	Et	H	Me	COOCH ₂ CH ₂ NHCH ₃	Ms	H
	Et	H	Me	COOCH ₂ CH ₂ OH	Ms	H
	Et	H	Me	COOCH ₂ CH ₂ CH ₂ NO ₂	Ms	H
30	Et	H	Me	COOY7	Ms	H
	Et	H	Me	COOCH ₂ COCH ₃	Ms	H
	Et	H	Me	COOCH ₂ CO ₂ CH ₃	Ms	H
	Et	H	Me	COOCH(CH ₃)COOEt	Ms	H
35	Et	H	Me	COOCH ₂ CH ₂ OPh	Ms	H
	Et	H	Me	COOCH ₂ CH ₂ OCH ₂ Ph	Ms	H
	Et	H	Me	COOPh-4-CH ₃	Ms	H
	Et	H	Me	COOPh-4-Cl	Ms	H
	Et	H	Me	COOPh-4-NO ₂	Ms	H
40	Et	H	Me	COOCH ₂ SiMe ₃	Ms	H
	Et	H	Me	COOY8	Ms	H
	Et	H	Me	COOCH ₂ Y8	Ms	H
	Et	H	Me	COOY9	Ms	H
	Et	H	Me	COOY10	Ms	H
45	Et	H	Me	CONHSO ₂ CH ₃	Ms	H
	Et	H	Me	CONHSO ₂ CF ₃	Ms	H
	Et	H	Cl	COOY4	Ms	H
	Et	H	Cl	COOY5	Ms	H

50

55

	A	B	X	Y	Z	Q
5	Et	H	Cl	COOY6	Ms	H
	Et	H	Cl	COOCH ₂ CH ₂ Cl	Ms	H
	Et	H	Cl	COOCH ₂ CF ₃	Ms	H
	Et	H	Cl	COOCH ₂ CCl=CH ₂	Ms	H
10	Et	H	Cl	COOCH ₂ CH ₂ OCH ₃	Ms	H
	Et	H	Cl	COOCH ₂ SCH ₃	Ms	H
	Et	H	Cl	COOCH ₂ CH ₂ OCH ₂ CH ₂ Cl	Ms	H
	Et	H	Cl	COOCH ₂ CH ₂ OMs	Ms	H
15	Et	H	Cl	COOCH ₂ OCH ₂ CH ₂ OCH ₃	Ms	H
	Et	H	Cl	COOCH ₂ CH ₂ Ms	Ms	H
	Et	H	Cl	COOCH ₂ CH ₂ CN	Ms	H
	Et	H	Cl	COOCH ₂ CH ₂ NHCH ₃	Ms	H
	Et	H	Cl	COOCH ₂ CH ₂ OH	Ms	H
20	Et	H	Cl	COOCH ₂ CH ₂ CH ₂ NO ₂	Ms	H
	Et	H	Cl	COOY7	Ms	H
	Et	H	Cl	COOCH ₂ COCH ₃	Ms	H
	Et	H	Cl	COOCH ₂ CO ₂ CH ₃	Ms	H
	Et	H	Cl	COOCH(CH ₃)COOEt	Ms	H
25	Et	H	Cl	COOCH ₂ CH ₂ OPh	Ms	H
	Et	H	Cl	COOCH ₂ CH ₂ OCH ₂ Ph	Ms	H
	Et	H	Cl	COOPh-4-CH ₃	Ms	H
	Et	H	Cl	COOPh-4-Cl	Ms	H
30	Et	H	Cl	COOPh-4-NO ₂	Ms	H
	Et	H	Cl	COOCH ₂ SiMe ₃	Ms	H
	Et	H	Cl	COOY8	Ms	H
	Et	H	Cl	COOCH ₂ Y8	Ms	H
	Et	H	Cl	COOY9	Ms	H
35	Et	H	Cl	COOY10	Ms	H
	Et	H	Cl	CONHSO ₂ CH ₃	Ms	H
	Et	H	Cl	CONHSO ₂ CF ₃	Ms	H
	Et	H	OMe	COOY4	Ms	H
	Et	H	OMe	COOY5	Ms	H
40	Et	H	OMe	COOY6	Ms	H
	Et	H	OMe	COOCH ₂ CH ₂ Cl	Ms	H
	Et	H	OMe	COOCH ₂ CF ₃	Ms	H
	Et	H	OMe	COOCH ₂ CCl=CH ₂	Ms	H
45	Et	H	OMe	COOCH ₂ CH ₂ OCH ₃	Ms	H
	Et	H	OMe	COOCH ₂ SCH ₃	Ms	H
	Et	H	OMe	COOCH ₂ CH ₂ OCH ₂ CH ₂ Cl	Ms	H
	Et	H	OMe	COOCH ₂ CH ₂ OMs	Ms	H

50

55

	A	B	X	Y	Z	Q
5	Et	H	OMe	COOCH ₂ OCH ₂ CH ₂ OCH ₃	Ms	H
	Et	H	OMe	COOCH ₂ CH ₂ Ms	Ms	H
	Et	H	OMe	COOCH ₂ CH ₂ CN	Ms	H
10	Et	H	OMe	COOCH ₂ CH ₂ NHCH ₃	Ms	H
	Et	H	OMe	COOCH ₂ CH ₂ OH	Ms	H
	Et	H	OMe	COOCH ₂ CH ₂ CH ₂ NO ₂	Ms	H
	Et	H	OMe	COOY7	Ms	H
	Et	H	OMe	COOCH ₂ COCH ₃	Ms	H
15	Et	H	OMe	COOCH ₂ CO ₂ CH ₃	Ms	H
	Et	H	OMe	COOCH(CH ₃)COOEt	Ms	H
	Et	H	OMe	COOCH ₂ CH ₂ OPh	Ms	H
	Et	H	OMe	COOCH ₂ CH ₂ OCH ₂ Ph	Ms	H
20	Et	H	OMe	COOPh-4-CH ₃	Ms	H
	Et	H	OMe	COOPh-4-Cl	Ms	H
	Et	H	OMe	COOPh-4-NO ₂	Ms	H
	Et	H	OMe	COOCH ₂ SiMe ₃	Ms	H
	Et	H	OMe	COOY8	Ms	H
25	Et	H	OMe	COOCH ₂ Y8	Ms	H
	Et	H	OMe	COOY9	Ms	H
	Et	H	OMe	COOY10	Ms	H
	Et	H	OMe	CONHSO ₂ CH ₃	Ms	H
	Et	H	OMe	CONHSO ₂ CF ₃	Ms	H
30	i-Pr	H	Me	COOY4	Ms	H
	i-Pr	H	Me	COOY5	Ms	H
	i-Pr	H	Me	COOY6	Ms	H
	i-Pr	H	Me	COOCH ₂ CH ₂ Cl	Ms	H
35	i-Pr	H	Me	COOCH ₂ CF ₃	Ms	H
	i-Pr	H	Me	COOCH ₂ CCl=CH ₂	Ms	H
	i-Pr	H	Me	COOCH ₂ CH ₂ OCH ₃	Ms	H
	i-Pr	H	Me	COOCH ₂ SCH ₃	Ms	H
	i-Pr	H	Me	COOCH ₂ CH ₂ OCH ₂ CH ₂ Cl	Ms	H
40	i-Pr	H	Me	COOCH ₂ CH ₂ OMs	Ms	H
	i-Pr	H	Me	COOCH ₂ OCH ₂ CH ₂ OCH ₃	Ms	H
	i-Pr	H	Me	COOCH ₂ CH ₂ Ms	Ms	H
	i-Pr	H	Me	COOCH ₂ CH ₂ CN	Ms	H
45	i-Pr	H	Me	COOCH ₂ CH ₂ NHCH ₃	Ms	H
	i-Pr	H	Me	COOCH ₂ CH ₂ OH	Ms	H
	i-Pr	H	Me	COOCH ₂ CH ₂ CH ₂ NO ₂	Ms	H
	i-Pr	H	Me	COOY7	Ms	H
	i-Pr	H	Me	COOCH ₂ COCH ₃	Ms	H

50

55

	A	B	X	Y	Z	Q
5	i-Pr	H	Me	COOCH ₂ CO ₂ CH ₃	Ms	H
	i-Pr	H	Me	COOCH(CH ₃)COOEt	Ms	H
	i-Pr	H	Me	COOCH ₂ CH ₂ OPh	Ms	H
10	i-Pr	H	Me	COOCH ₂ CH ₂ OCH ₂ Ph	Ms	H
	i-Pr	H	Me	COOPh-4-CH ₃	Ms	H
	i-Pr	H	Me	COOPh-4-Cl	Ms	H
	i-Pr	H	Me	COOPh-4-NO ₂	Ms	H
	i-Pr	H	Me	COOCH ₂ SiMe ₃	Ms	H
15	i-Pr	H	Me	COOY8	Ms	H
	i-Pr	H	Me	COOCH ₂ Y8	Ms	H
	i-Pr	H	Me	COOY9	Ms	H
	i-Pr	H	Me	COOY10	Ms	H
20	i-Pr	H	Me	CONHSO ₂ CH ₃	Ms	H
	i-Pr	H	Me	CONHSO ₂ CF ₃	Ms	H
	i-Pr	H	Cl	COOY4	Ms	H
	i-Pr	H	Cl	COOY5	Ms	H
	i-Pr	H	Cl	COOY6	Ms	H
25	i-Pr	H	Cl	COOCH ₂ CH ₂ Cl	Ms	H
	i-Pr	H	Cl	COOCH ₂ CF ₃	Ms	H
	i-Pr	H	Cl	COOCH ₂ CCl=CH ₂	Ms	H
	i-Pr	H	Cl	COOCH ₂ CH ₂ OCH ₃	Ms	H
	i-Pr	H	Cl	COOCH ₂ SCH ₃	Ms	H
30	i-Pr	H	Cl	COOCH ₂ CH ₂ OCH ₂ CH ₂ Cl	Ms	H
	i-Pr	H	Cl	COOCH ₂ CH ₂ OMs	Ms	H
	i-Pr	H	Cl	COOCH ₂ OCH ₂ CH ₂ OCH ₃	Ms	H
	i-Pr	H	Cl	COOCH ₂ CH ₂ Ms	Ms	H
35	i-Pr	H	Cl	COOCH ₂ CH ₂ CN	Ms	H
	i-Pr	H	Cl	COOCH ₂ CH ₂ NHCH ₃	Ms	H
	i-Pr	H	Cl	COOCH ₂ CH ₂ OH	Ms	H
	i-Pr	H	Cl	COOCH ₂ CH ₂ CH ₂ NO ₂	Ms	H
	i-Pr	H	Cl	COOY7	Ms	H
40	i-Pr	H	Cl	COOCH ₂ COCH ₃	Ms	H
	i-Pr	H	Cl	COOCH ₂ CO ₂ CH ₃	Ms	H
	i-Pr	H	Cl	COOCH(CH ₃)COOEt	Ms	H
	i-Pr	H	Cl	COOCH ₂ CH ₂ OPh	Ms	H
45	i-Pr	H	Cl	COOCH ₂ CH ₂ OCH ₂ Ph	Ms	H
	i-Pr	H	Cl	COOPh-4-CH ₃	Ms	H
	i-Pr	H	Cl	COOPh-4-Cl	Ms	H
	i-Pr	H	Cl	COOPh-4-NO ₂	Ms	H
	i-Pr	H	Cl	COOCH ₂ SiMe ₃	Ms	H

50

55

	A	B	X	Y	Z	Q
5	i-Pr	H	Cl	COOY8	Ms	H
	i-Pr	H	Cl	COOCH ₂ Y8	Ms	H
	i-Pr	H	Cl	COOY9	Ms	H
	i-Pr	H	Cl	COOY10	Ms	H
10	i-Pr	H	Cl	CONHSO ₂ CH ₃	Ms	H
	i-Pr	H	Cl	CONHSO ₂ CF ₃	Ms	H
	i-Pr	H	OMe	COOY4	Ms	H
	i-Pr	H	OMe	COOY5	Ms	H
15	i-Pr	H	OMe	COOY6	Ms	H
	i-Pr	H	OMe	COOCH ₂ CH ₂ Cl	Ms	H
	i-Pr	H	OMe	COOCH ₂ CF ₃	Ms	H
	i-Pr	H	OMe	COOCH ₂ CCl=CH ₂	Ms	H
	i-Pr	H	OMe	COOCH ₂ CH ₂ OCH ₃	Ms	H
20	i-Pr	H	OMe	COOCH ₂ SCH ₃	Ms	H
	i-Pr	H	OMe	COOCH ₂ CH ₂ OCH ₂ CH ₂ Cl	Ms	H
	i-Pr	H	OMe	COOCH ₂ CH ₂ OMs	Ms	H
	i-Pr	H	OMe	COOCH ₂ OCH ₂ CH ₂ OCH ₃	Ms	H
25	i-Pr	H	OMe	COOCH ₂ CH ₂ Ms	Ms	H
	i-Pr	H	OMe	COOCH ₂ CH ₂ CN	Ms	H
	i-Pr	H	OMe	COOCH ₂ CH ₂ NHCH ₃	Ms	H
	i-Pr	H	OMe	COOCH ₂ CH ₂ OH	Ms	H
	i-Pr	H	OMe	COOCH ₂ CH ₂ CH ₂ NO ₂	Ms	H
30	i-Pr	H	OMe	COOY7	Ms	H
	i-Pr	H	OMe	COOCH ₂ COCH ₃	Ms	H
	i-Pr	H	OMe	COOCH ₂ CO ₂ CH ₃	Ms	H
	i-Pr	H	OMe	COOCH(CH ₃)COOEt	Ms	H
	i-Pr	H	OMe	COOCH ₂ CH ₂ OPh	Ms	H
35	i-Pr	H	OMe	COOCH ₂ CH ₂ OCH ₂ Ph	Ms	H
	i-Pr	H	OMe	COOPh-4-CH ₃	Ms	H
	i-Pr	H	OMe	COOPh-4-Cl	Ms	H
	i-Pr	H	OMe	COOPh-4-NO ₂	Ms	H
40	i-Pr	H	OMe	COOCH ₂ SiMe ₃	Ms	H
	i-Pr	H	OMe	COOY8	Ms	H
	i-Pr	H	OMe	COOCH ₂ Y8	Ms	H
	i-Pr	H	OMe	COOY9	Ms	H
	i-Pr	H	OMe	COOY10	Ms	H
45	i-Pr	H	OMe	CONHSO ₂ CH ₃	Ms	H
	i-Pr	H	OMe	CONHSO ₂ CF ₃	Ms	H

50

55

	A	B	X	Y	Z	Q
5	Me	H	Me	CON(CH ₃) OCH ₃	Ms	H
	Me	H	Me	CONHPh	Ms	H
	Me	H	Me	COOCH ₂ COC(CH ₃) ₃	Ms	H
	Me	H	Me	COOCH ₂ COPh	Ms	H
10	Me	H	Me	COOSi(CH ₃) ₃	Ms	H
	Me	H	Me	COON=C(CH ₃) ₂	Ms	H
	Me	H	Me	COOY11	Ms	H
	Me	H	Me	COOY12	Ms	H
15	Me	H	Me	COOCH ₂ OCOC(CH ₃) ₃	Ms	H
	Me	H	Me	COOCH ₂ OCOCH ₃	Ms	H
	Me	H	Me	COOCH ₂ CH ₂ OCH ₂ CH=CH ₂	Ms	H
	Me	H	Me	COOCH ₂ CH ₂ OCH ₂ C≡CH	Ms	H
	Me	H	OMe	CON(CH ₃) OCH ₃	Ms	H
20	Me	H	OMe	CONHPh	Ms	H
	Me	H	OMe	COOCH ₂ COC(CH ₃) ₃	Ms	H
	Me	H	OMe	COOCH ₂ COPh	Ms	H
	Me	H	OMe	COOSi(CH ₃) ₃	Ms	H
25	Me	H	OMe	COON=C(CH ₃) ₂	Ms	H
	Me	H	OMe	COOY11	Ms	H
	Me	H	OMe	COOY12	Ms	H
	Me	H	OMe	COOCH ₂ OCOC(CH ₃) ₃	Ms	H
	Me	H	OMe	COOCH ₂ OCOCH ₃	Ms	H
30	Me	H	OMe	COOCH ₂ CH ₂ OCH ₂ CH=CH ₂	Ms	H
	Me	H	OMe	COOCH ₂ CH ₂ OCH ₂ C≡CH	Ms	H
	Me	H	Cl	CON(CH ₃) OCH ₃	Ms	H
	Me	H	Cl	CONHPh	Ms	H
35	Me	H	Cl	COOCH ₂ COC(CH ₃) ₃	Ms	H
	Me	H	Cl	COOCH ₂ COPh	Ms	H
	Me	H	Cl	COOSi(CH ₃) ₃	Ms	H
	Me	H	Cl	COON=C(CH ₃) ₂	Ms	H
	Me	H	Cl	COOY11	Ms	H
	Me	H	Cl	COOY12	Ms	H
40	Me	H	Cl	COOCH ₂ OCOC(CH ₃) ₃	Ms	H
	Me	H	Cl	COOCH ₂ OCOCH ₃	Ms	H
	Me	H	Cl	COOCH ₂ CH ₂ OCH ₂ CH=CH ₂	Ms	H
	Me	H	Cl	COOCH ₂ CH ₂ OCH ₂ C≡CH	Ms	H
45	Et	H	Me	CON(CH ₃) OCH ₃	Ms	H
	Et	H	Me	CONHPh	Ms	H
	Et	H	Me	COOCH ₂ COC(CH ₃) ₃	Ms	H
	Et	H	Me	COOCH ₂ COPh	Ms	H

50

55

	A	B	X	Y	Z	Q
5	Et	H	Me	COOSi(CH ₃) ₃	Ms	H
	Et	H	Me	COON=C(CH ₃) ₂	Ms	H
	Et	H	Me	COOY11	Ms	H
	Et	H	Me	COOY12	Ms	H
10	Et	H	Me	COOCH ₂ OCOC(CH ₃) ₃	Ms	H
	Et	H	Me	COOCH ₂ OCOCH ₃	Ms	H
	Et	H	Me	COOCH ₂ CH ₂ OCH ₂ CH=CH ₂	Ms	H
	Et	H	Me	COOCH ₂ CH ₂ OCH ₂ C≡CH	Ms	H
15	Et	H	OMe	CON(CH ₃)OCH ₃	Ms	H
	Et	H	OMe	CONHPh	Ms	H
	Et	H	OMe	COOCH ₂ COC(CH ₃) ₃	Ms	H
	Et	H	OMe	COOCH ₂ COPh	Ms	H
	Et	H	OMe	COOSi(CH ₃) ₃	Ms	H
20	Et	H	OMe	COON=C(CH ₃) ₂	Ms	H
	Et	H	OMe	COOY11	Ms	H
	Et	H	OMe	COOY12	Ms	H
	Et	H	OMe	COOCH ₂ OCOC(CH ₃) ₃	Ms	H
	Et	H	OMe	COOCH ₂ OCOCH ₃	Ms	H
25	Et	H	OMe	COOCH ₂ CH ₂ OCH ₂ CH=CH ₂	Ms	H
	Et	H	OMe	COOCH ₂ CH ₂ OCH ₂ C≡CH	Ms	H
	Et	H	Cl	CON(CH ₃)OCH ₃	Ms	H
	Et	H	Cl	CONHPh	Ms	H
30	Et	H	Cl	COOCH ₂ COC(CH ₃) ₃	Ms	H
	Et	H	Cl	COOCH ₂ COPh	Ms	H
	Et	H	Cl	COOSi(CH ₃) ₃	Ms	H
	Et	H	Cl	COON=C(CH ₃) ₂	Ms	H
	Et	H	Cl	COOY11	Ms	H
35	Et	H	Cl	COOY12	Ms	H
	Et	H	Cl	COOCH ₂ OCOC(CH ₃) ₃	Ms	H
	Et	H	Cl	COOCH ₂ OCOCH ₃	Ms	H
	Et	H	Cl	COOCH ₂ CH ₂ OCH ₂ CH=CH ₂	Ms	H
	Et	H	Cl	COOCH ₂ CH ₂ OCH ₂ C≡CH	Ms	H
40	i-Pr	H	Me	CON(CH ₃)OCH ₃	Ms	H
	i-Pr	H	Me	CONHPh	Ms	H
	i-Pr	H	Me	COOCH ₂ COC(CH ₃) ₃	Ms	H
	i-Pr	H	Me	COOCH ₂ COPh	Ms	H
45	i-Pr	H	Me	COOSi(CH ₃) ₃	Ms	H
	i-Pr	H	Me	COON=C(CH ₃) ₂	Ms	H
	i-Pr	H	Me	COOY11	Ms	H
	i-Pr	H	Me	COOY12	Ms	H

50

55

	A	B	X	Y	Z	Q
5	i-Pr	H	Me	$\text{COOCH}_2\text{OCOC}(\text{CH}_3)_3$	Ms	H
	i-Pr	H	Me	$\text{COOCH}_2\text{OCOCH}_3$	Ms	H
	i-Pr	H	Me	$\text{COOCH}_2\text{CH}_2\text{OCH}_2\text{CH}=\text{CH}_2$	Ms	H
	i-Pr	H	Me	$\text{COOCH}_2\text{CH}_2\text{OCH}_2\text{C}\equiv\text{CH}$	Ms	H
10	i-Pr	H	OMe	$\text{CON}(\text{CH}_3)\text{OCH}_3$	Ms	H
	i-Pr	H	OMe	CONHPh	Ms	H
	i-Pr	H	OMe	$\text{COOCH}_2\text{COC}(\text{CH}_3)_3$	Ms	H
	i-Pr	H	OMe	$\text{COOCH}_2\text{COPh}$	Ms	H
	i-Pr	H	OMe	$\text{COOSi}(\text{CH}_3)_3$	Ms	H
15	i-Pr	H	OMe	$\text{COON}=\text{C}(\text{CH}_3)_2$	Ms	H
	i-Pr	H	OMe	COOYL1	Ms	H
	i-Pr	H	OMe	COOYL2	Ms	H
	i-Pr	H	OMe	$\text{COOCH}_2\text{OCOC}(\text{CH}_3)_3$	Ms	H
20	i-Pr	H	OMe	$\text{COOCH}_2\text{OCOCH}_3$	Ms	H
	i-Pr	H	OMe	$\text{COOCH}_2\text{CH}_2\text{OCH}_2\text{CH}=\text{CH}_2$	Ms	H
	i-Pr	H	OMe	$\text{COOCH}_2\text{CH}_2\text{OCH}_2\text{C}\equiv\text{CH}$	Ms	H
	i-Pr	H	Cl	$\text{CON}(\text{CH}_3)\text{OCH}_3$	Ms	H
	i-Pr	H	Cl	CONHPh	Ms	H
25	i-Pr	H	Cl	$\text{COOCH}_2\text{COC}(\text{CH}_3)_3$	Ms	H
	i-Pr	H	Cl	$\text{COOCH}_2\text{COPh}$	Ms	H
	i-Pr	H	Cl	$\text{COOSi}(\text{CH}_3)_3$	Ms	H
	i-Pr	H	Cl	$\text{COON}=\text{C}(\text{CH}_3)_2$	Ms	H
	i-Pr	H	Cl	COOYL1	Ms	H
30	i-Pr	H	Cl	COOYL2	Ms	H
	i-Pr	H	Cl	$\text{COOCH}_2\text{OCOC}(\text{CH}_3)_3$	Ms	H
	i-Pr	H	Cl	$\text{COOCH}_2\text{OCOCH}_3$	Ms	H
	i-Pr	H	Cl	$\text{COOCH}_2\text{CH}_2\text{OCH}_2\text{CH}=\text{CH}_2$	Ms	H
35	i-Pr	H	Cl	$\text{COOCH}_2\text{CH}_2\text{OCH}_2\text{C}\equiv\text{CH}$	Ms	H

40

45

50

55

	A	B	X	Y	Z	Q
5	Me	H	Me	CH ₂ OH	Ms	H
	Me	H	Me	CH ₂ OMe	Ms	H
	Me	H	Me	CH ₂ OMe	Cl	H
10	Me	H	Me	CH ₂ OMe	MeS	H
	Me	H	Me	CH ₂ OMe	MeSO	H
	Me	H	Me	CH ₂ OMe	Ms	Q1
	Me	H	Me	CH ₂ OMe	MeS	Q1
	Me	H	Me	CH ₂ OMe	MeSO	Q1
15	Me	H	Me	CH ₂ OMe	Ms	Q2
	Me	H	Me	CH ₂ OMe	MeS	Q2
	Me	H	Me	CH ₂ OMe	MeSO	Q2
	Me	H	Me	CH ₂ OMe	Ms	Q3
20	Me	H	Me	CH ₂ OMe	MeS	Q3
	Me	H	Me	CH ₂ OMe	MeSO	Q3
	Me	H	Me	CH ₂ OMe	Ms	Q4
	Me	H	Me	CH ₂ OMe	Ms	Q5
	Me	H	Me	CH ₂ OMe	Ms	Q6
25	Me	H	Me	CH ₂ OMe	Ms	Q7
	Me	H	Me	CH ₂ OMe	Ms	Q8
	Me	H	Me	CH ₂ OMe	Ms	Q9
	Me	H	Me	CH ₂ OE t	Ms	H
30	Me	H	Me	CH ₂ OE t	Cl	H
	Me	H	Me	CH ₂ OE t	MeS	H
	Me	H	Me	CH ₂ OE t	MeSO	H
	Me	H	Me	CH ₂ OE t	Ms	Q1
	Me	H	Me	CH ₂ OE t	MeS	Q1
35	Me	H	Me	CH ₂ OE t	MeSO	Q1
	Me	H	Me	CH ₂ OE t	Ms	Q2
	Me	H	Me	CH ₂ OE t	MeS	Q2
	Me	H	Me	CH ₂ OE t	MeSO	Q2
	Me	H	Me	CH ₂ OE t	Ms	Q3
40	Me	H	Me	CH ₂ OE t	MeS	Q3
	Me	H	Me	CH ₂ OE t	MeSO	Q3
	Me	H	Me	CH ₂ OE t	Ms	Q4
	Me	H	Me	CH ₂ OE t	Ms	Q5
45	Me	H	Me	CH ₂ OE t	Ms	Q6
	Me	H	Me	CH ₂ OE t	Ms	Q7
	Me	H	Me	CH ₂ OE t	Ms	Q8
	Me	H	Me	CH ₂ OE t	Ms	Q9
	Me	H	Me	CH ₂ OPr-i	Ms	H
50						
55						

	A	B	X	Y	Z	Q
5	Me	H	Me	CH ₂ OPr-i	Cl	H
	Me	H	Me	CH ₂ OPr-i	MeS	H
	Me	H	Me	CH ₂ OPr-i	MeSO	H
	Me	H	Me	CH ₂ OPr-i	Ms	Q1
10	Me	H	Me	CH ₂ OPr-i	Ms	Q2
	Me	H	Me	CH ₂ OPr-i	Ms	Q3
	Me	H	Me	CH ₂ OPr-n	Ms	H
	Me	H	Me	CH ₂ OPr-n	Cl	H
15	Me	H	Me	CH ₂ OPr-n	MeS	H
	Me	H	Me	CH ₂ OPr-n	MeSO	H
	Me	H	Me	CH ₂ OCH = CH ₂	Ms	H
	Me	H	Me	CH ₂ OCH = CH ₂	Cl	H
	Me	H	Me	CH ₂ OCH = CH ₂	MeS	H
20	Me	H	Me	CH ₂ OCH = CH ₂	MeSO	H
	Me	H	Me	CH ₂ OCH ₂ CH = CH ₂	Ms	H
	Me	H	Me	CH ₂ OCH ₂ CH = CH ₂	Cl	H
	Me	H	Me	CH ₂ OCH ₂ CH = CH ₂	MeS	H
	Me	H	Me	CH ₂ OCH ₂ CH = CH ₂	MeSO	H
25	Me	H	Me	CH ₂ OCH ₂ C ≡ CH	Ms	H
	Me	H	Me	CH ₂ OCH ₂ C ≡ CH	Cl	H
	Me	H	Me	CH ₂ OCH ₂ C ≡ CH	MeS	H
	Me	H	Me	CH ₂ OCH ₂ C ≡ CH	MeSO	H
30	Me	H	Me	CH ₂ OCH ₂ CH ₂ Cl	Ms	H
	Me	H	Me	CH ₂ OCH ₂ CH ₂ Cl	Cl	H
	Me	H	Me	CH ₂ OCH ₂ CH ₂ Cl	MeS	H
	Me	H	Me	CH ₂ OCH ₂ CH ₂ Cl	MeSO	H
	Me	H	Me	CH ₂ OCH ₂ CH ₂ Br	Ms	H
35	Me	H	Me	CH ₂ OCH ₂ CH ₂ CN	Ms	H
	Me	H	Me	CH ₂ OAm-n	Ms	H
	Me	H	Me	CH ₂ O-Y5	Ms	H
	Me	H	Me	CHMeOH	Ms	H
	Me	H	Me	CHMeOMe	Ms	H
40	Me	H	Me	CHMeOMe	Cl	H
	Me	H	Me	CHMeOMe	MeS	H
	Me	H	Me	CHMeOMe	MeSO	H
	Me	H	Me	CHMeOMe	Ms	Q1
45	Me	H	Me	CHMeOMe	Ms	Q2
	Me	H	Me	CHMeOMe	Ms	Q3
	Me	H	Me	CHMeOEt	Ms	H
	Me	H	Me	CHMeOEt	Cl	H

50

55

	A	B	X	Y	Z	Q
5	Me	H	Me	CHMeOEt	MeS	H
	Me	H	Me	CHMeOEt	MeSO	H
	Me	H	Me	CHMeOEt	Ms	Q1
10	Me	H	Me	CHMeOEt	Ms	Q2
	Me	H	Me	CHMeOEt	Ms	Q3
	Me	H	Me	CHMeOPr-i	Ms	H
	Me	H	Me	CHMeOPr-i	Cl	H
	Me	H	Me	CHMeOPr-i	MeS	H
15	Me	H	Me	CHMeOPr-i	MeSO	H
	Me	H	Me	CHMeOPr-n	Ms	H
	Me	H	Me	CHMeOCH=CH ₂	Ms	H
	Me	H	Me	CHMeOCH=CH ₂	Ms	H
20	Me	H	Me	CHMeOCH ₂ CH=CH ₂	Ms	H
	Me	H	Me	CHMeOCH ₂ C≡CH	Ms	H
	Me	H	Me	CHMeOCH ₂ CH ₂ Cl	Ms	H
	Me	H	Me	CHMeO-Y5	Ms	H
	Me	H	Me	CMe ₂ OH	Ms	H
25	Me	H	Me	CMe ₂ OMe	Ms	H
	Me	H	Me	CMe ₂ OMe	Cl	H
	Me	H	Me	CMe ₂ OMe	MeS	H
	Me	H	Me	CMe ₂ OMe	MeSO	H
	Me	H	Me	CMe ₂ OEt	Ms	H
30	Me	H	Me	CMe ₂ OEt	Cl	H
	Me	H	Me	CMe ₂ OEt	MeS	H
	Me	H	Me	CMe ₂ OEt	MeSO	H
	Me	H	Me	CMe ₂ OPr-i	Ms	H
35	Me	H	Me	CH ₂ CH ₂ OMe	Ms	H
	Me	H	Me	CH ₂ CH ₂ OMe	Cl	H
	Me	H	Me	CH ₂ CH ₂ OMe	MeS	H
	Me	H	Me	CH ₂ CH ₂ OMe	MeSO	H
40	Me	H	Me	CH ₂ CH ₂ OEt	Ms	H
	Me	H	Me	CH ₂ CH ₂ OEt	Cl	H
	Me	H	Me	CH ₂ CH ₂ OEt	MeS	H
	Me	H	Me	CH ₂ CH ₂ OEt	MeSO	H
	Me	H	Me	CH ₂ CH ₂ OPr-i	Ms	H
45	Me	H	Me	CH ₂ CH ₂ OPr-i	Cl	H
	Me	H	Me	CH ₂ CH ₂ OPr-i	MeS	H
	Me	H	Me	CH ₂ CH ₂ OPr-i	MeSO	H
	Me	H	Me	CHEtOH	Ms	H
50	Me	H	Me	CHEtOMe	Ms	H

55

	A	B	X	Y	Z	Q
5	Me	H	Me	CHEtOMe	Cl	H
	Me	H	Me	CHEtOMe	MeS	H
	Me	H	Me	CHEtOMe	MeSO	H
	Me	H	Me	CHEtOEt	Ms	H
10	Me	H	Me	CHEtOPr-i	Ms	H
	Me	H	Me	CH ₂ OCH ₂ CH ₂ OMe	Ms	H
	Me	H	Me	CH ₂ OCH ₂ CH ₂ OMe	Cl	H
	Me	H	Me	CH ₂ OCH ₂ CH ₂ OMe	MeS	H
15	Me	H	Me	CH ₂ OCH ₂ CH ₂ OMe	MeSO	H
	Me	H	Me	CH ₂ OCH ₂ CH ₂ OEt	Ms	H
	Me	H	Me	CHMeOCH ₂ CH ₂ OMe	Ms	H
	Me	H	Me	CH ₂ O-Y8	Ms	H
	Me	H	Me	CH ₂ O-Y9	Ms	H
20	Me	H	Me	CH ₂ O-Y10	Ms	H
	Me	H	Me	CHMeO-Y8	Ms	H
	Me	H	Me	CHMeO-Y9	Ms	H
	Me	H	Me	CHMeO-Y10	Ms	H
25	Me	H	Me	CH ₂ O-Y13	Ms	H
	Me	H	Me	CHMeO-Y13	Ms	H
	Me	H	Me	CH ₂ NHMe	Ms	H
	Me	H	Me	CH ₂ NMe ₂	Ms	H
	Me	H	Me	CH ₂ NEtMe	Ms	H
30	Me	H	Me	CH ₂ NEt ₂	Ms	H
	Me	H	Me	CH ₂ -Y14	Ms	H
	Me	H	Me	CHMeNMe ₂	Ms	H
	Me	H	Me	CH ₂ CH ₂ NMe ₂	Ms	H
35	Me	H	Me	CH ₂ OCH ₂ Ph	Ms	H
	Me	H	Me	CHMeOCH ₂ Ph	Ms	H
	Me	H	Me	CH ₂ OCH ₂ CO ₂ Me	Ms	H
	Me	H	Me	CH ₂ OCH ₂ CO ₂ Et	Ms	H
	Me	H	Me	CH ₂ OCHMeCO ₂ Me	Ms	H
40	Me	H	Me	CH ₂ CN	Ms	H
	Me	H	Me	CHMeCN	Ms	H
	Me	H	Me	CH ₂ SMe	Ms	H
	Me	H	Me	CH ₂ SMe	Cl	H
	Me	H	Me	CH ₂ SMe	MeS	H
45	Me	H	Me	CH ₂ SMe	MeSO	H
	Me	H	Me	CH ₂ SEt	Ms	H
	Me	H	Me	CH ₂ SEt	Cl	H
	Me	H	Me	CH ₂ SEt	MeS	H

50

55

	A	B	X	Y	Z	Q
5	Me	H	Me	CH ₂ SEt	MeSO	H
	Me	H	Me	CH ₂ SOMe	Ms	H
	Me	H	Me	CH ₂ SOEt	Ms	H
10	Me	H	Me	CH ₂ SO ₂ Me	Ms	H
	Me	H	Me	CH ₂ SO ₂ Me	Cl	H
	Me	H	Me	CH ₂ SO ₂ Me	MeS	H
	Me	H	Me	CH ₂ SO ₂ Me	MeSO	H
	Me	H	Me	CH ₂ SO ₂ Et	Ms	H
15	Me	H	Me	CH ₂ SO ₂ Et	Cl	H
	Me	H	Me	CH ₂ SO ₂ Et	MeS	H
	Me	H	Me	CH ₂ SO ₂ Et	MeSO	H
	Me	H	Me	CHMeSMe	Ms	H
20	Me	H	Me	CHMeSEt	Ms	H
	Me	H	Me	CHMeSO ₂ Me	Ms	H
	Me	H	Me	CHMeSO ₂ Et	Ms	H
	Me	H	Me	CH ₂ SCH ₂ CH ₂ OMe	Ms	H
	Me	H	Me	CH ₂ OCOMe	Ms	H
25	Me	H	Me	CH ₂ OCOEt	Ms	H
	Me	H	Me	CHMeOCOMe	Ms	H
	Me	H	Me	CH ₂ OSO ₂ Me	Ms	H
	Me	H	Me	CH ₂ OSO ₂ Et	Ms	H
30	Et	H	Me	CHMeOSO ₂ Me	Ms	H
	Et	H	Me	CH ₂ OH	Ms	H
	Et	H	Me	CH ₂ OMe	Ms	H
	Et	H	Me	CH ₂ OMe	Cl	H
	Et	H	Me	CH ₂ OMe	MeS	H
35	Et	H	Me	CH ₂ OMe	MeSO	H
	Et	H	Me	CH ₂ OMe	Ms	Q1
	Et	H	Me	CH ₂ OMe	MeS	Q1
	Et	H	Me	CH ₂ OMe	MeSO	Q1
40	Et	H	Me	CH ₂ OMe	Ms	Q2
	Et	H	Me	CH ₂ OMe	MeS	Q2
	Et	H	Me	CH ₂ OMe	MeSO	Q2
	Et	H	Me	CH ₂ OMe	Ms	Q3
	Et	H	Me	CH ₂ OMe	MeS	Q3
45	Et	H	Me	CH ₂ OMe	MeSO	Q3
	Et	H	Me	CH ₂ OMe	Ms	Q4
	Et	H	Me	CH ₂ OMe	Ms	Q5
	Et	H	Me	CH ₂ OMe	Ms	Q6
50						
55						

	A	B	X	Y	Z	Q
5	Et	H	Me	CH ₂ OMe	Ms	Q8
	Et	H	Me	CH ₂ OMe	Ms	Q9
	Et	H	Me	CH ₂ OEt	Ms	H
	Et	H	Me	CH ₂ OEt	Cl	H
10	Et	H	Me	CH ₂ OEt	MeS	H
	Et	H	Me	CH ₂ OEt	MeSO	H
	Et	H	Me	CH ₂ OEt	Ms	Q1
	Et	H	Me	CH ₂ OEt	MeS	Q1
	Et	H	Me	CH ₂ OEt	MeSO	Q1
15	Et	H	Me	CH ₂ OEt	Ms	Q2
	Et	H	Me	CH ₂ OEt	MeS	Q2
	Et	H	Me	CH ₂ OEt	MeSO	Q2
	Et	H	Me	CH ₂ OEt	Ms	Q3
20	Et	H	Me	CH ₂ OEt	MeS	Q3
	Et	H	Me	CH ₂ OEt	MeSO	Q3
	Et	H	Me	CH ₂ OEt	Ms	Q4
	Et	H	Me	CH ₂ OEt	Ms	Q5
	Et	H	Me	CH ₂ OEt	Ms	Q6
25	Et	H	Me	CH ₂ OEt	Ms	Q7
	Et	H	Me	CH ₂ OEt	Ms	Q8
	Et	H	Me	CH ₂ OEt	Ms	Q9
	Et	H	Me	CH ₂ OPr-i	Ms	H
30	Et	H	Me	CH ₂ OPr-i	Cl	H
	Et	H	Me	CH ₂ OPr-i	MeS	H
	Et	H	Me	CH ₂ OPr-i	MeSO	H
	Et	H	Me	CH ₂ OPr-i	Ms	Q1
	Et	H	Me	CH ₂ OPr-i	Ms	Q2
35	Et	H	Me	CH ₂ OPr-i	Ms	Q3
	Et	H	Me	CH ₂ OPr-n	Ms	H
	Et	H	Me	CH ₂ OPr-n	Cl	H
	Et	H	Me	CH ₂ OPr-n	MeS	H
	Et	H	Me	CH ₂ OPr-n	MeSO	H
40	Et	H	Me	CH ₂ OCH=CH ₂	Ms	H
	Et	H	Me	CH ₂ OCH=CH ₂	Cl	H
	Et	H	Me	CH ₂ OCH=CH ₂	MeS	H
	Et	H	Me	CH ₂ OCH=CH ₂	MeSO	H
45	Et	H	Me	CH ₂ OCH ₂ CH=CH ₂	Ms	H
	Et	H	Me	CH ₂ OCH ₂ CH=CH ₂	Cl	H
	Et	H	Me	CH ₂ OCH ₂ CH=CH ₂	MeS	H
	Et	H	Me	CH ₂ OCH ₂ CH=CH ₂	MeSO	H

50

55

	A	B	X	Y	Z	Q
5	Et	H	Me	$\text{CH}_2\text{OCH}_2\text{C} \equiv \text{CH}$	Ms	H
	Et	H	Me	$\text{CH}_2\text{OCH}_2\text{C} \equiv \text{CH}$	Cl	H
	Et	H	Me	$\text{CH}_2\text{OCH}_2\text{C} \equiv \text{CH}$	MeS	H
	Et	H	Me	$\text{CH}_2\text{OCH}_2\text{C} \equiv \text{CH}$	MeSO	H
10	Et	H	Me	$\text{CH}_2\text{OCH}_2\text{CH}_2\text{Cl}$	Ms	H
	Et	H	Me	$\text{CH}_2\text{OCH}_2\text{CH}_2\text{Cl}$	Cl	H
	Et	H	Me	$\text{CH}_2\text{OCH}_2\text{CH}_2\text{Cl}$	MeS	H
	Et	H	Me	$\text{CH}_2\text{OCH}_2\text{CH}_2\text{Cl}$	MeSO	H
15	Et	H	Me	$\text{CH}_2\text{OCH}_2\text{CH}_2\text{Br}$	Ms	H
	Et	H	Me	$\text{CH}_2\text{OCH}_2\text{CH}_2\text{CN}$	Ms	H
	Et	H	Me	$\text{CH}_2\text{OAm-n}$	Ms	H
	Et	H	Me	$\text{CH}_2\text{O-Y5}$	Ms	H
	Et	H	Me	CHMeOH	Ms	H
20	Et	H	Me	CHMeOMe	Ms	H
	Et	H	Me	CHMeOMe	Cl	H
	Et	H	Me	CHMeOMe	MeS	H
	Et	H	Me	CHMeOMe	MeSO	H
25	Et	H	Me	CHMeOMe	Ms	Q1
	Et	H	Me	CHMeOMe	Ms	Q2
	Et	H	Me	CHMeOMe	Ms	Q3
	Et	H	Me	CHMeOEt	Ms	H
	Et	H	Me	CHMeOEt	Cl	H
30	Et	H	Me	CHMeOEt	MeS	H
	Et	H	Me	CHMeOEt	MeSO	H
	Et	H	Me	CHMeOEt	Ms	Q1
	Et	H	Me	CHMeOEt	Ms	Q2
	Et	H	Me	CHMeOEt	Ms	Q3
35	Et	H	Me	CHMeOPr-i	Ms	H
	Et	H	Me	CHMeOPr-i	Cl	H
	Et	H	Me	CHMeOPr-i	MeS	H
	Et	H	Me	CHMeOPr-i	MeSO	H
40	Et	H	Me	CHMeOPr-n	Ms	H
	Et	H	Me	$\text{CHMeOCH}=\text{CH}_2$	Ms	H
	Et	H	Me	$\text{CHMeOCH}=\text{CH}_2$	Ms	H
	Et	H	Me	$\text{CHMeOCH}_2\text{CH}=\text{CH}_2$	Ms	H
	Et	H	Me	$\text{CHMeOCH}_2\text{C} \equiv \text{CH}$	Ms	H
45	Et	H	Me	$\text{CHMeOCH}_2\text{CH}_2\text{Cl}$	Ms	H
	Et	H	Me	CHMeO-Y5	Ms	H
	Et	H	Me	CMe ₂ OH	Ms	H
	Et	H	Me	CMe ₂ OMe	Ms	H

50

55

	A	E	X	Y	Z	Q
5	Et	H	Me	CMe ₂ OMe	Cl	H
	Et	H	Me	CMe ₂ OMe	MeS	H
	Et	H	Me	CMe ₂ OMe	MeSO	H
	Et	H	Me	CMe ₂ OEt	Ms	H
10	Et	H	Me	CMe ₂ OEt	Cl	H
	Et	H	Me	CMe ₂ OEt	MeS	H
	Et	H	Me	CMe ₂ OEt	MeSO	H
	Et	H	Me	CMe ₂ OPr-i	Ms	H
15	Et	H	Me	CH ₂ CH ₂ OMe	Ms	H
	Et	H	Me	CH ₂ CH ₂ OMe	Cl	H
	Et	H	Me	CH ₂ CH ₂ OMe	MeS	H
	Et	H	Me	CH ₂ CH ₂ OMe	MeSO	H
	Et	H	Me	CH ₂ CH ₂ OEt	Ms	H
20	Et	H	Me	CH ₂ CH ₂ OEt	Cl	H
	Et	H	Me	CH ₂ CH ₂ OEt	MeS	H
	Et	H	Me	CH ₂ CH ₂ OEt	MeSO	H
	Et	H	Me	CH ₂ CH ₂ OPr-i	Ms	H
25	Et	H	Me	CH ₂ CH ₂ OPr-i	Cl	H
	Et	H	Me	CH ₂ CH ₂ OPr-i	MeS	H
	Et	H	Me	CH ₂ CH ₂ OPr-i	MeSO	H
	Et	H	Me	CH ₂ OH	Ms	H
	Et	H	Me	CH ₂ OMe	Ms	H
30	Et	H	Me	CH ₂ OMe	Cl	H
	Et	H	Me	CH ₂ OMe	MeS	H
	Et	H	Me	CH ₂ OMe	MeSO	H
	Et	H	Me	CH ₂ OEt	Ms	H
	Et	H	Me	CH ₂ OPr-i	Ms	H
35	Et	H	Me	CH ₂ OCH ₂ CH ₂ OMe	Ms	H
	Et	H	Me	CH ₂ OCH ₂ CH ₂ OMe	Cl	H
	Et	H	Me	CH ₂ OCH ₂ CH ₂ OMe	MeS	H
	Et	H	Me	CH ₂ OCH ₂ CH ₂ OMe	MeSO	H
40	Et	H	Me	CH ₂ OCH ₂ CH ₂ OEt	Ms	H
	Et	H	Me	CHMeOCH ₂ CH ₂ OMe	Ms	H
	Et	H	Me	CH ₂ O-Y8	Ms	H
	Et	H	Me	CH ₂ O-Y9	Ms	H
	Et	H	Me	CH ₂ O-Y10	Ms	H
45	Et	H	Me	CHMeO-Y8	Ms	H
	Et	H	Me	CHMeO-Y9	Ms	H
	Et	H	Me	CHMeO-Y10	Ms	H
	Et	H	Me	CH ₂ O-Y13	Ms	H

50

55

	A	B	X	Y	Z	Q
5	Et	H	Me	CHMeO-Y13	Ms	H
	Et	H	Me	CH ₂ NHMe	Ms	H
	Et	H	Me	CH ₂ NMe ₂	Ms	H
10	Et	H	Me	CH ₂ NEtMe	Ms	H
	Et	H	Me	CH ₂ NEt ₂	Ms	H
	Et	H	Me	CH ₂ -Y14	Ms	H
	Et	H	Me	CHMeNMe ₂	Ms	H
	Et	H	Me	CH ₂ CH ₂ NMe ₂	Ms	H
15	Et	H	Me	CH ₂ OCH ₂ Ph	Ms	H
	Et	H	Me	CHMeOCH ₂ Ph	Ms	H
	Et	H	Me	CH ₂ OCH ₂ CO ₂ Me	Ms	H
	Et	H	Me	CH ₂ OCH ₂ CO ₂ Et	Ms	H
20	Et	H	Me	CH ₂ OCHMeCO ₂ Me	Ms	H
	Et	H	Me	CH ₂ CN	Ms	H
	Et	H	Me	CHMeCN	Ms	H
	Et	H	Me	CH ₂ SMe	Ms	H
25	Et	H	Me	CH ₂ SMe	Cl	H
	Et	H	Me	CH ₂ SMe	MeS	H
	Et	H	Me	CH ₂ SMe	MeSO	H
	Et	H	Me	CH ₂ SEt	Ms	H
	Et	H	Me	CH ₂ SEt	Cl	H
30	Et	H	Me	CH ₂ SEt	MeS	H
	Et	H	Me	CH ₂ SEt	MeSO	H
	Et	H	Me	CH ₂ SOMe	Ms	H
	Et	H	Me	CH ₂ SOEt	Ms	H
	Et	H	Me	CH ₂ SO ₂ Me	Ms	H
35	Et	H	Me	CH ₂ SO ₂ Me	Cl	H
	Et	H	Me	CH ₂ SO ₂ Me	MeS	H
	Et	H	Me	CH ₂ SO ₂ Me	MeSO	H
	Et	H	Me	CH ₂ SO ₂ Et	Ms	H
40	Et	H	Me	CH ₂ SO ₂ Et	Cl	H
	Et	H	Me	CH ₂ SO ₂ Et	MeS	H
	Et	H	Me	CH ₂ SO ₂ Et	MeSO	H
	Et	H	Me	CHMeSMe	Ms	H
	Et	H	Me	CHMeSEt	Ms	H
45	Et	H	Me	CHMeSO ₂ Me	Ms	H
	Et	H	Me	CHMeSO ₂ Et	Ms	H
	Et	H	Me	CH ₂ SCH ₂ CH ₂ OMe	Ms	H
	Et	H	Me	CH ₂ OCOMe	Ms	H
50	Et	H	Me	CH ₂ OCOEt	Ms	H

	A	E	X	Y	Z	Q
5	Et	H	Me	CHMeOCOMe	Ms	H
	Et	H	Me	CH ₂ OSO ₂ Me	Ms	H
	Et	H	Me	CH ₂ OSO ₂ Et	Ms	H
	Et	H	Me	CHMeOSO ₂ Me	Ms	H
10	Pr-i	H	Me	CH ₂ OH	Ms	H
	Pr-i	H	Me	CH ₂ OMe	Ms	H
	Pr-i	H	Me	CH ₂ OMe	Cl	H
	Pr-i	H	Me	CH ₂ OMe	MeS	H
	Pr-i	H	Me	CH ₂ OMe	MeSO	H
15	Pr-i	H	Me	CH ₂ OMe	Ms	Q1
	Pr-i	H	Me	CH ₂ OMe	MeS	Q1
	Pr-i	H	Me	CH ₂ OMe	MeSO	Q1
	Pr-i	H	Me	CH ₂ OMe	Ms	Q2
20	Pr-i	H	Me	CH ₂ OMe	MeS	Q2
	Pr-i	H	Me	CH ₂ OMe	MeSO	Q2
	Pr-i	H	Me	CH ₂ OMe	Ms	Q3
	Pr-i	H	Me	CH ₂ OMe	MeS	Q3
	Pr-i	H	Me	CH ₂ OMe	MeSO	Q3
25	Pr-i	H	Me	CH ₂ OMe	Ms	Q4
	Pr-i	H	Me	CH ₂ OMe	Ms	Q5
	Pr-i	H	Me	CH ₂ OMe	Ms	Q6
	Pr-i	H	Me	CH ₂ OMe	Ms	Q7
30	Pr-i	H	Me	CH ₂ OMe	Ms	Q8
	Pr-i	H	Me	CH ₂ OMe	Ms	Q9
	Pr-i	H	Me	CH ₂ OEt	Ms	H
	Pr-i	H	Me	CH ₂ OEt	Cl	H
	Pr-i	H	Me	CH ₂ OEt	MeS	H
35	Pr-i	H	Me	CH ₂ OEt	MeSO	H
	Pr-i	H	Me	CH ₂ OEt	Ms	Q1
	Pr-i	H	Me	CH ₂ OEt	MeS	Q1
	Pr-i	H	Me	CH ₂ OEt	MeSO	Q1
	Pr-i	H	Me	CH ₂ OEt	Ms	Q2
40	Pr-i	H	Me	CH ₂ OEt	MeS	Q2
	Pr-i	H	Me	CH ₂ OEt	MeSO	Q2
	Pr-i	H	Me	CH ₂ OEt	Ms	Q3
	Pr-i	H	Me	CH ₂ OEt	MeS	Q3
45	Pr-i	H	Me	CH ₂ OEt	MeSO	Q3
	Pr-i	H	Me	CH ₂ OEt	Ms	Q4
	Pr-i	H	Me	CH ₂ OEt	Ms	Q5
	Pr-i	H	Me	CH ₂ OEt	Ms	Q6

50

55

	A	B	X	Y	Z	Q
5	Pr-i	H	Me	CH ₂ OEt	Ms	Q7
	Pr-i	H	Me	CH ₂ OEt	Ms	Q8
	Pr-i	H	Me	CH ₂ OEt	Ms	Q9
10	Pr-i	H	Me	CH ₂ OPr-i	Ms	H
	Pr-i	H	Me	CH ₂ OPr-i	Cl	H
	Pr-i	H	Me	CH ₂ OPr-i	MeS	H
	Pr-i	H	Me	CH ₂ OPr-i	MeSO	H
	Pr-i	H	Me	CH ₂ OPr-i	Ms	Q1
15	Pr-i	H	Me	CH ₂ OPr-i	Ms	Q2
	Pr-i	H	Me	CH ₂ OPr-i	Ms	Q3
	Pr-i	H	Me	CH ₂ OPr-n	Ms	H
	Pr-i	H	Me	CH ₂ OPr-n	Cl	H
	Pr-i	H	Me	CH ₂ OPr-n	MeS	H
20	Pr-i	H	Me	CH ₂ OPr-n	MeSO	H
	Pr-i	H	Me	CH ₂ OCH=CH ₂	Ms	H
	Pr-i	H	Me	CH ₂ OCH=CH ₂	Cl	H
	Pr-i	H	Me	CH ₂ OCH=CH ₂	MeS	H
25	Pr-i	H	Me	CH ₂ OCH=CH ₂	MeSO	H
	Pr-i	H	Me	CH ₂ OCH ₂ CH=CH ₂	Ms	H
	Pr-i	H	Me	CH ₂ OCH ₂ CH=CH ₂	Cl	H
	Pr-i	H	Me	CH ₂ OCH ₂ CH=CH ₂	MeS	H
	Pr-i	H	Me	CH ₂ OCH ₂ CH=CH ₂	MeSO	H
30	Pr-i	H	Me	CH ₂ OCH ₂ C≡CH	Ms	H
	Pr-i	H	Me	CH ₂ OCH ₂ C≡CH	Cl	H
	Pr-i	H	Me	CH ₂ OCH ₂ C≡CH	MeS	H
	Pr-i	H	Me	CH ₂ OCH ₂ C≡CH	MeSO	H
	Pr-i	H	Me	CH ₂ OCH ₂ CH ₂ Cl	Ms	H
35	Pr-i	H	Me	CH ₂ OCH ₂ CH ₂ Cl	Cl	H
	Pr-i	H	Me	CH ₂ OCH ₂ CH ₂ Cl	MeS	H
	Pr-i	H	Me	CH ₂ OCH ₂ CH ₂ Cl	MeSO	H
	Pr-i	H	Me	CH ₂ OCH ₂ CH ₂ Br	Ms	H
40	Pr-i	H	Me	CH ₂ OCH ₂ CH ₂ CN	Ms	H
	Pr-i	H	Me	CH ₂ OAm-n	Ms	H
	Pr-i	H	Me	CH ₂ O-Y5	Ms	H
	Pr-i	H	Me	CHMeOH	Ms	H
	Pr-i	H	Me	CHMeOMe	Ms	H
45	Pr-i	H	Me	CHMeOMe	Cl	H
	Pr-i	H	Me	CHMeOMe	MeS	H
	Pr-i	H	Me	CHMeOMe	MeSO	H
	Pr-i	H	Me	CHMeOMe	Ms	Q1
50						
55						

	A	B	X	Y	Z	Q
5	Pr-i	H	Me	CHMeOMe	Ms	Q2
	Pr-i	H	Me	CHMeOMe	Ms	Q3
	Pr-i	H	Me	CHMeOEt	Ms	H
	Pr-i	H	Me	CHMeOEt	Cl	H
10	Pr-i	H	Me	CHMeOEt	MeS	H
	Pr-i	H	Me	CHMeOEt	MeSO	H
	Pr-i	H	Me	CHMeOEt	Ms	Q1
	Pr-i	H	Me	CHMeOEt	Ms	Q2
	Pr-i	H	Me	CHMeOEt	Ms	Q3
15	Pr-i	H	Me	CHMeOPr-i	Ms	H
	Pr-i	H	Me	CHMeOPr-i	Cl	H
	Pr-i	H	Me	CHMeOPr-i	MeS	H
	Pr-i	H	Me	CHMeOPr-i	MeSO	H
20	Pr-i	H	Me	CHMeOPr-n	Ms	H
	Pr-i	H	Me	CHMeOCH=CH ₂	Ms	H
	Pr-i	H	Me	CHMeOCH=CH ₂	Ms	H
	Pr-i	H	Me	CHMeOCH ₂ CH=CH ₂	Ms	H
	Pr-i	H	Me	CHMeOCH ₂ C≡CH	Ms	H
25	Pr-i	H	Me	CHMeOCH ₂ CH ₂ Cl	Ms	H
	Pr-i	H	Me	CHMeO-Y5	Ms	H
	Pr-i	H	Me	CMe ₂ OH	Ms	H
	Pr-i	H	Me	CMe ₂ OMe	Ms	H
30	Pr-i	H	Me	CMe ₂ OMe	Cl	H
	Pr-i	H	Me	CMe ₂ OMe	MeS	H
	Pr-i	H	Me	CMe ₂ OMe	MeSO	H
	Pr-i	H	Me	CMe ₂ OEt	Ms	H
	Pr-i	H	Me	CMe ₂ OEt	Cl	H
35	Pr-i	H	Me	CMe ₂ OEt	MeS	H
	Pr-i	H	Me	CMe ₂ OEt	MeSO	H
	Pr-i	H	Me	CMe ₂ OPr-i	Ms	H
	Pr-i	H	Me	CH ₂ CH ₂ OMe	Ms	H
40	Pr-i	H	Me	CH ₂ CH ₂ OMe	Cl	H
	Pr-i	H	Me	CH ₂ CH ₂ OMe	MeS	H
	Pr-i	H	Me	CH ₂ CH ₂ OMe	MeSO	H
	Pr-i	H	Me	CH ₂ CH ₂ OEt	Ms	H
	Pr-i	H	Me	CH ₂ CH ₂ OEt	Cl	H
45	Pr-i	H	Me	CH ₂ CH ₂ OEt	MeS	H
	Pr-i	H	Me	CH ₂ CH ₂ OEt	MeSO	H
	Pr-i	H	Me	CH ₂ CH ₂ OPr-i	Ms	H
	Pr-i	H	Me	CH ₂ CH ₂ OPr-i	Cl	H

50

55

	A	B	X	Y	Z	Q
5	Pr-i	H	Me	CH ₂ CH ₂ OPr-i	MeS	H
	Pr-i	H	Me	CH ₂ CH ₂ OPr-i	MeSO	H
	Pr-i	H	Me	CH ₂ OH	Ms	H
10	Pr-i	H	Me	CH ₂ OMe	Ms	H
	Pr-i	H	Me	CH ₂ OMe	Cl	H
	Pr-i	H	Me	CH ₂ OMe	MeS	H
	Pr-i	H	Me	CH ₂ OMe	MeSO	H
	Pr-i	H	Me	CH ₂ OE t	Ms	H
15	Pr-i	H	Me	CH ₂ OPr-i	Ms	H
	Pr-i	H	Me	CH ₂ OCH ₂ CH ₂ OMe	Ms	H
	Pr-i	H	Me	CH ₂ OCH ₂ CH ₂ OMe	Cl	H
	Pr-i	H	Me	CH ₂ OCH ₂ CH ₂ OMe	MeS	H
20	Pr-i	H	Me	CH ₂ OCH ₂ CH ₂ OMe	MeSO	H
	Pr-i	H	Me	CH ₂ OCH ₂ CH ₂ OE t	Ms	H
	Pr-i	H	Me	CHMeOCH ₂ CH ₂ OMe	Ms	H
	Pr-i	H	Me	CH ₂ O-Y8	Ms	H
	Pr-i	H	Me	CH ₂ O-Y9	Ms	H
25	Pr-i	H	Me	CH ₂ O-Y10	Ms	H
	Pr-i	H	Me	CHMeO-Y8	Ms	H
	Pr-i	H	Me	CHMeO-Y9	Ms	H
	Pr-i	H	Me	CHMeO-Y10	Ms	H
	Pr-i	H	Me	CH ₂ O-Y13	Ms	H
30	Pr-i	H	Me	CHMeO-Y13	Ms	H
	Pr-i	H	Me	CH ₂ NHMe	Ms	H
	Pr-i	H	Me	CH ₂ NMe ₂	Ms	H
	Pr-i	H	Me	CH ₂ NE t Me	Ms	H
35	Pr-i	H	Me	CH ₂ NE t ₂	Ms	H
	Pr-i	H	Me	CH ₂ -Y14	Ms	H
	Pr-i	H	Me	CHMeNMe ₂	Ms	H
	Pr-i	H	Me	CH ₂ CH ₂ NMe ₂	Ms	H
40	Pr-i	H	Me	CH ₂ OCH ₂ Ph	Ms	H
	Pr-i	H	Me	CHMeOCH ₂ Ph	Ms	H
	Pr-i	H	Me	CH ₂ OCH ₂ CO ₂ Me	Ms	H
	Pr-i	H	Me	CH ₂ OCH ₂ CO ₂ Et	Ms	H
	Pr-i	H	Me	CH ₂ OCHMeCO ₂ Me	Ms	H
45	Pr-i	H	Me	CH ₂ CN	Ms	H
	Pr-i	H	Me	CHMeCN	Ms	H
	Pr-i	H	Me	CH ₂ SMe	Ms	H
	Pr-i	H	Me	CH ₂ SMe	Cl	H
50	Pr-i	H	Me	CH ₂ SMe	MeS	H

55

	A	B	X	Y	Z	Q
5	Pr-i	H	Me	CH ₂ SMe	MeSO	H
	Pr-i	H	Me	CH ₂ SEt	Ms	H
	Pr-i	H	Me	CH ₂ SEt	Cl	H
	Pr-i	H	Me	CH ₂ SEt	MeS	H
10	Pr-i	H	Me	CH ₂ SEt	MeSO	H
	Pr-i	H	Me	CH ₂ SOMe	Ms	H
	Pr-i	H	Me	CH ₂ SOEt	Ms	H
	Pr-i	H	Me	CH ₂ SO ₂ Me	Ms	H
	Pr-i	H	Me	CH ₂ SO ₂ Me	Cl	H
15	Pr-i	H	Me	CH ₂ SO ₂ Me	MeS	H
	Pr-i	H	Me	CH ₂ SO ₂ Me	MeSO	H
	Pr-i	H	Me	CH ₂ SO ₂ Et	Ms	H
	Pr-i	H	Me	CH ₂ SO ₂ Et	Cl	H
20	Pr-i	H	Me	CH ₂ SO ₂ Et	MeS	H
	Pr-i	H	Me	CH ₂ SO ₂ Et	MeSO	H
	Pr-i	H	Me	CHMeSMe	Ms	H
	Pr-i	H	Me	CHMeSEt	Ms	H
	Pr-i	H	Me	CHMeSO ₂ Me	Ms	H
25	Pr-i	H	Me	CHMeSO ₂ Et	Ms	H
	Pr-i	H	Me	CH ₂ SCH ₂ CH ₂ OMe	Ms	H
	Pr-i	H	Me	CH ₂ OCOMe	Ms	H
	Pr-i	H	Me	CH ₂ OCOEt	Ms	H
	Pr-i	H	Me	CHMeOCOMe	Ms	H
30	Pr-i	H	Me	CH ₂ OSO ₂ Me	Ms	H
	Pr-i	H	Me	CH ₂ OSO ₂ Et	Ms	H
	Pr-i	H	Me	CHMeOSO ₂ Me	Ms	H

35

40

45

50

55

	A	B	X	Y	Z	Q
5	Me	H	Cl	CH ₂ OH	Ms	H
	Me	H	Cl	CH ₂ OMe	Ms	H
	Me	H	Cl	CH ₂ OMe	Cl	H
10	Me	H	Cl	CH ₂ OMe	MeS	H
	Me	H	Cl	CH ₂ OMe	MeSO	H
	Me	H	Cl	CH ₂ OMe	Ms	Q1
	Me	H	Cl	CH ₂ OMe	MeS	Q1
	Me	H	Cl	CH ₂ OMe	MeSO	Q1
15	Me	H	Cl	CH ₂ OMe	Ms	Q2
	Me	H	Cl	CH ₂ OMe	MeS	Q2
	Me	H	Cl	CH ₂ OMe	MeSO	Q2
	Me	H	Cl	CH ₂ OMe	Ms	Q3
20	Me	H	Cl	CH ₂ OMe	MeS	Q3
	Me	H	Cl	CH ₂ OMe	MeSO	Q3
	Me	H	Cl	CH ₂ OMe	Ms	Q4
	Me	H	Cl	CH ₂ OMe	Ms	Q5
	Me	H	Cl	CH ₂ OMe	Ms	Q6
25	Me	H	Cl	CH ₂ OMe	Ms	Q7
	Me	H	Cl	CH ₂ OMe	Ms	Q8
	Me	H	Cl	CH ₂ OMe	Ms	Q9
	Me	H	Cl	CH ₂ OEt	Ms	H
30	Me	H	Cl	CH ₂ OEt	Cl	H
	Me	H	Cl	CH ₂ OEt	MeS	H
	Me	H	Cl	CH ₂ OEt	MeSO	H
	Me	H	Cl	CH ₂ OEt	Ms	Q1
	Me	H	Cl	CH ₂ OEt	MeS	Q1
35	Me	H	Cl	CH ₂ OEt	MeSO	Q1
	Me	H	Cl	CH ₂ OEt	Ms	Q2
	Me	H	Cl	CH ₂ OEt	MeS	Q2
	Me	H	Cl	CH ₂ OEt	MeSO	Q2
	Me	H	Cl	CH ₂ OEt	Ms	Q3
40	Me	H	Cl	CH ₂ OEt	MeS	Q3
	Me	H	Cl	CH ₂ OEt	MeSO	Q3
	Me	H	Cl	CH ₂ OEt	Ms	Q4
	Me	H	Cl	CH ₂ OEt	Ms	Q5
	Me	H	Cl	CH ₂ OEt	Ms	Q6
45	Me	H	Cl	CH ₂ OEt	Ms	Q7
	Me	H	Cl	CH ₂ OEt	Ms	Q8
	Me	H	Cl	CH ₂ OEt	Ms	Q9
50	Me	H	Cl	CH ₂ OPr-i	Ms	H

55

	A	B	X	Y	Z	Q
5	Me	H	Cl	CH ₂ OPr-i	Cl	H
	Me	H	Cl	CH ₂ OPr-i	MeS	H
	Me	H	Cl	CH ₂ OPr-i	MeSO	H
	Me	H	Cl	CH ₂ OPr-i	Ms	Q1
10	Me	H	Cl	CH ₂ OPr-i	Ms	Q2
	Me	H	Cl	CH ₂ OPr-i	Ms	Q3
	Me	H	Cl	CH ₂ OPr-n	Ms	H
	Me	H	Cl	CH ₂ OPr-n	Cl	H
15	Me	H	Cl	CH ₂ OPr-n	MeS	H
	Me	H	Cl	CH ₂ OPr-n	MeSO	H
	Me	H	Cl	CH ₂ OCH=CH ₂	Ms	H
	Me	H	Cl	CH ₂ OCH=CH ₂	Cl	H
	Me	H	Cl	CH ₂ OCH=CH ₂	MeS	H
20	Me	H	Cl	CH ₂ OCH=CH ₂	MeSO	H
	Me	H	Cl	CH ₂ OCH ₂ CH=CH ₂	Ms	H
	Me	H	Cl	CH ₂ OCH ₂ CH=CH ₂	Cl	H
	Me	H	Cl	CH ₂ OCH ₂ CH=CH ₂	MeS	H
25	Me	H	Cl	CH ₂ OCH ₂ CH=CH ₂	MeSO	H
	Me	H	Cl	CH ₂ OCH ₂ C≡CH	Ms	H
	Me	H	Cl	CH ₂ OCH ₂ C≡CH	Cl	H
	Me	H	Cl	CH ₂ OCH ₂ C≡CH	MeS	H
	Me	H	Cl	CH ₂ OCH ₂ C≡CH	MeSO	H
30	Me	H	Cl	CH ₂ OCH ₂ CH ₂ Cl	Ms	H
	Me	H	Cl	CH ₂ OCH ₂ CH ₂ Cl	Cl	H
	Me	H	Cl	CH ₂ OCH ₂ CH ₂ Cl	MeS	H
	Me	H	Cl	CH ₂ OCH ₂ CH ₂ Cl	MeSO	H
	Me	H	Cl	CH ₂ OCH ₂ CH ₂ Br	Ms	H
35	Me	H	Cl	CH ₂ OCH ₂ CH ₂ CN	Ms	H
	Me	H	Cl	CH ₂ OAm-n	Ms	H
	Me	H	Cl	CH ₂ O-Y5	Ms	H
	Me	H	Cl	CHMeOH	Ms	H
	Me	H	Cl	CHMeOMe	Ms	H
40	Me	H	Cl	CHMeOMe	Cl	H
	Me	H	Cl	CHMeOMe	MeS	H
	Me	H	Cl	CHMeOMe	MeSO	H
	Me	H	Cl	CHMeOMe	Ms	Q1
45	Me	H	Cl	CHMeOMe	Ms	Q2
	Me	H	Cl	CHMeOMe	Ms	Q3
	Me	H	Cl	CHMeOEt	Ms	H
	Me	H	Cl	CHMeOEt	Cl	H

50

55

	A	B	X	Y	Z	Q
5	Me	H	Cl	CHMeOE t	MeS	H
	Me	H	Cl	CHMeOE t	MeSO	H
	Me	H	Cl	CHMeOE t	Ms	Q1
	Me	H	Cl	CHMeOE t	Ms	Q2
10	Me	H	Cl	CHMeOE t	Ms	Q3
	Me	H	Cl	CHMeOPr-i	Ms	H
	Me	H	Cl	CHMeOPr-i	Cl	H
	Me	H	Cl	CHMeOPr-i	MeS	H
15	Me	H	Cl	CHMeOPr-i	MeSO	H
	Me	H	Cl	CHMeOPr-n	Ms	H
	Me	H	Cl	CHMeOCH=CH ₂	Ms	H
	Me	H	Cl	CHMeOCH=CH ₂	Ms	H
	Me	H	Cl	CHMeOCH ₂ CH=CH ₂	Ms	H
20	Me	H	Cl	CHMeOCH ₂ C≡CH	Ms	H
	Me	H	Cl	CHMeOCH ₂ CH ₂ Cl	Ms	H
	Me	H	Cl	CHMeO-Y5	Ms	H
	Me	H	Cl	CMe ₂ OH	Ms	H
25	Me	H	Cl	CMe ₂ OMe	Ms	H
	Me	H	Cl	CMe ₂ OMe	Cl	H
	Me	H	Cl	CMe ₂ OMe	MeS	H
	Me	H	Cl	CMe ₂ OMe	MeSO	H
	Me	H	Cl	CMe ₂ OE t	Ms	H
30	Me	H	Cl	CMe ₂ OE t	Cl	H
	Me	H	Cl	CMe ₂ OE t	MeS	H
	Me	H	Cl	CMe ₂ OE t	MeSO	H
	Me	H	Cl	CMe ₂ OPr-i	Ms	H
35	Me	H	Cl	CH ₂ CH ₂ OMe	Ms	H
	Me	H	Cl	CH ₂ CH ₂ OMe	Cl	H
	Me	H	Cl	CH ₂ CH ₂ OMe	MeS	H
	Me	H	Cl	CH ₂ CH ₂ OMe	MeSO	H
	Me	H	Cl	CH ₂ CH ₂ OE t	Ms	H
40	Me	H	Cl	CH ₂ CH ₂ OE t	Cl	H
	Me	H	Cl	CH ₂ CH ₂ OE t	MeS	H
	Me	H	Cl	CH ₂ CH ₂ OE t	MeSO	H
	Me	H	Cl	CH ₂ CH ₂ OPr-i	Ms	H
	Me	H	Cl	CH ₂ CH ₂ OPr-i	Cl	H
45	Me	H	Cl	CH ₂ CH ₂ OPr-i	MeS	H
	Me	H	Cl	CH ₂ CH ₂ OPr-i	MeSO	H
	Me	H	Cl	CHEtOH	Ms	H
	Me	H	Cl	CHEtOMe	Ms	H

50

55

	A	B	X	Y	Z	Q
5	Me	H	Cl	CHEtOMe	Cl	H
	Me	H	Cl	CHEtOMe	MeS	H
	Me	H	Cl	CHEtOMe	MeSO	H
	Me	H	Cl	CHEtOEt	Ms	H
10	Me	H	Cl	CHEtOPr-i	Ms	H
	Me	H	Cl	CH ₂ OCH ₂ CH ₂ OMe	Ms	H
	Me	H	Cl	CH ₂ OCH ₂ CH ₂ OMe	Cl	H
	Me	H	Cl	CH ₂ OCH ₂ CH ₂ OMe	MeS	H
15	Me	H	Cl	CH ₂ OCH ₂ CH ₂ OMe	MeSO	H
	Me	H	Cl	CH ₂ OCH ₂ CH ₂ OEt	Ms	H
	Me	H	Cl	CHMeOCH ₂ CH ₂ OMe	Ms	H
	Me	H	Cl	CH ₂ O-Y8	Ms	H
	Me	H	Cl	CH ₂ O-Y9	Ms	H
20	Me	H	Cl	CH ₂ O-Y10	Ms	H
	Me	H	Cl	CHMeO-Y8	Ms	H
	Me	H	Cl	CHMeO-Y9	Ms	H
	Me	H	Cl	CHMeO-Y10	Ms	H
	Me	H	Cl	CH ₂ O-Y13	Ms	H
25	Me	H	Cl	CHMeO-Y13	Ms	H
	Me	H	Cl	CH ₂ NHMe	Ms	H
	Me	H	Cl	CH ₂ NMe ₂	Ms	H
	Me	H	Cl	CH ₂ NEtMe	Ms	H
30	Me	H	Cl	CH ₂ NEt ₂	Ms	H
	Me	H	Cl	CH ₂ -Y14	Ms	H
	Me	H	Cl	CHMeNMe ₂	Ms	H
	Me	H	Cl	CH ₂ CH ₂ NMe ₂	Ms	H
	Me	H	Cl	CH ₂ OCH ₂ Ph	Ms	H
35	Me	H	Cl	CHMeOCH ₂ Ph	Ms	H
	Me	H	Cl	CH ₂ OCH ₂ CO ₂ Me	Ms	H
	Me	H	Cl	CH ₂ OCH ₂ CO ₂ Et	Ms	H
	Me	H	Cl	CH ₂ OCHMeCO ₂ Me	Ms	H
40	Me	H	Cl	CH ₂ CN	Ms	H
	Me	H	Cl	CHMeCN	Ms	H
	Me	H	Cl	CH ₂ SMe	Ms	H
	Me	H	Cl	CH ₂ SMe	Cl	H
	Me	H	Cl	CH ₂ SMe	MeS	H
45	Me	H	Cl	CH ₂ SMe	MeSO	H
	Me	H	Cl	CH ₂ SEt	Ms	H
	Me	H	Cl	CH ₂ SEt	Cl	H
	Me	H	Cl	CH ₂ SEt	MeS	H

50

55

	A	B	X	Y	Z	Q
5	Me	H	Cl	CH ₂ SEt	MeSO	H
	Me	H	Cl	CH ₂ SOMe	Ms	H
	Me	H	Cl	CH ₂ SOEt	Ms	H
10	Me	H	Cl	CH ₂ SO ₂ Me	Ms	H
	Me	H	Cl	CH ₂ SO ₂ Me	Cl	H
	Me	H	Cl	CH ₂ SO ₂ Me	MeS	H
	Me	H	Cl	CH ₂ SO ₂ Me	MeSO	H
	Me	H	Cl	CH ₂ SO ₂ Et	Ms	H
15	Me	H	Cl	CH ₂ SO ₂ Et	Cl	H
	Me	H	Cl	CH ₂ SO ₂ Et	MeS	H
	Me	H	Cl	CH ₂ SO ₂ Et	MeSO	H
	Me	H	Cl	CHMeSMe	Ms	H
	Me	H	Cl	CHMeSEt	Ms	H
20	Me	H	Cl	CHMeSO ₂ Me	Ms	H
	Me	H	Cl	CHMeSO ₂ Et	Ms	H
	Me	H	Cl	CH ₂ SCH ₂ CH ₂ OMe	Ms	H
	Me	H	Cl	CH ₂ OCOMe	Ms	H
25	Me	H	Cl	CH ₂ OCOEt	Ms	H
	Me	H	Cl	CHMeOCOMe	Ms	H
	Me	H	Cl	CH ₂ OSO ₂ Me	Ms	H
	Me	H	Cl	CH ₂ OSO ₂ Et	Ms	H
	Me	H	Cl	CHMeOSO ₂ Me	Ms	H
30	Et	H	Cl	CH ₂ OH	Ms	H
	Et	H	Cl	CH ₂ OMe	Ms	H
	Et	H	Cl	CH ₂ OMe	Cl	H
	Et	H	Cl	CH ₂ OMe	MeS	H
35	Et	H	Cl	CH ₂ OMe	MeSO	H
	Et	H	Cl	CH ₂ OMe	Ms	Q1
	Et	H	Cl	CH ₂ OMe	MeS	Q1
	Et	H	Cl	CH ₂ OMe	MeSO	Q1
	Et	H	Cl	CH ₂ OMe	Ms	Q2
40	Et	H	Cl	CH ₂ OMe	MeS	Q2
	Et	H	Cl	CH ₂ OMe	MeSO	Q2
	Et	H	Cl	CH ₂ OMe	Ms	Q3
	Et	H	Cl	CH ₂ OMe	MeS	Q3
	Et	H	Cl	CH ₂ OMe	MeSO	Q3
45	Et	H	Cl	CH ₂ OMe	Ms	Q4
	Et	H	Cl	CH ₂ OMe	Ms	Q5
	Et	H	Cl	CH ₂ OMe	Ms	Q6
	Et	H	Cl	CH ₂ OMe	Ms	Q7
50						
55						

	A	B	X	Y	Z	Q
5	Et	H	Cl	CH ₂ OMe	Ms	Q8
	Et	H	Cl	CH ₂ OMe	Ms	Q9
	Et	H	Cl	CH ₂ OEt	Ms	H
	Et	H	Cl	CH ₂ OEt	Cl	H
10	Et	H	Cl	CH ₂ OEt	MeS	H
	Et	H	Cl	CH ₂ OEt	MeSO	H
	Et	H	Cl	CH ₂ OEt	Ms	Q1
	Et	H	Cl	CH ₂ OEt	MeS	Q1
15	Et	H	Cl	CH ₂ OEt	MeSO	Q1
	Et	H	Cl	CH ₂ OEt	Ms	Q2
	Et	H	Cl	CH ₂ OEt	MeS	Q2
	Et	H	Cl	CH ₂ OEt	MeSO	Q2
	Et	H	Cl	CH ₂ OEt	Ms	Q3
20	Et	H	Cl	CH ₂ OEt	MeS	Q3
	Et	H	Cl	CH ₂ OEt	MeSO	Q3
	Et	H	Cl	CH ₂ OEt	Ms	Q4
	Et	H	Cl	CH ₂ OEt	Ms	Q5
	Et	H	Cl	CH ₂ OEt	Ms	Q6
25	Et	H	Cl	CH ₂ OEt	Ms	Q7
	Et	H	Cl	CH ₂ OEt	Ms	Q8
	Et	H	Cl	CH ₂ OEt	Ms	Q9
	Et	H	Cl	CH ₂ OPr-i	Ms	H
30	Et	H	Cl	CH ₂ OPr-i	Cl	H
	Et	H	Cl	CH ₂ OPr-i	MeS	H
	Et	H	Cl	CH ₂ OPr-i	MeSO	H
	Et	H	Cl	CH ₂ OPr-i	Ms	Q1
	Et	H	Cl	CH ₂ OPr-i	Ms	Q2
35	Et	H	Cl	CH ₂ OPr-i	Ms	Q3
	Et	H	Cl	CH ₂ OPr-n	Ms	H
	Et	H	Cl	CH ₂ OPr-n	Cl	H
	Et	H	Cl	CH ₂ OPr-n	MeS	H
	Et	H	Cl	CH ₂ OPr-n	MeSO	H
40	Et	H	Cl	CH ₂ OCH=CH ₂	Ms	H
	Et	H	Cl	CH ₂ OCH=CH ₂	Cl	H
	Et	H	Cl	CH ₂ OCH=CH ₂	MeS	H
	Et	H	Cl	CH ₂ OCH=CH ₂	MeSO	H
45	Et	H	Cl	CH ₂ OCH ₂ CH=CH ₂	Ms	H
	Et	H	Cl	CH ₂ OCH ₂ CH=CH ₂	Cl	H
	Et	H	Cl	CH ₂ OCH ₂ CH=CH ₂	MeS	H
	Et	H	Cl	CH ₂ OCH ₂ CH=CH ₂	MeSO	H

50

55

	A	B	X	Y	Z	Q
5	Et	H	Cl	$\text{CH}_2\text{OCH}_2\text{C}\equiv\text{CH}$	Ms	H
	Et	H	Cl	$\text{CH}_2\text{OCH}_2\text{C}\equiv\text{CH}$	Cl	H
	Et	H	Cl	$\text{CH}_2\text{OCH}_2\text{C}\equiv\text{CH}$	MeS	H
	Et	H	Cl	$\text{CH}_2\text{OCH}_2\text{C}\equiv\text{CH}$	MeSO	H
10	Et	H	Cl	$\text{CH}_2\text{OCH}_2\text{CH}_2\text{Cl}$	Ms	H
	Et	H	Cl	$\text{CH}_2\text{OCH}_2\text{CH}_2\text{Cl}$	Cl	H
	Et	H	Cl	$\text{CH}_2\text{OCH}_2\text{CH}_2\text{Cl}$	MeS	H
	Et	H	Cl	$\text{CH}_2\text{OCH}_2\text{CH}_2\text{Cl}$	MeSO	H
15	Et	H	Cl	$\text{CH}_2\text{OCH}_2\text{CH}_2\text{Br}$	Ms	H
	Et	H	Cl	$\text{CH}_2\text{OCH}_2\text{CH}_2\text{CN}$	Ms	H
	Et	H	Cl	$\text{CH}_2\text{OAm-n}$	Ms	H
	Et	H	Cl	$\text{CH}_2\text{O-Y5}$	Ms	H
	Et	H	Cl	CHMeOH	Ms	H
20	Et	H	Cl	CHMeOMe	Ms	H
	Et	H	Cl	CHMeOMe	Cl	H
	Et	H	Cl	CHMeOMe	MeS	H
	Et	H	Cl	CHMeOMe	MeSO	H
25	Et	H	Cl	CHMeOMe	Ms	Q1
	Et	H	Cl	CHMeOMe	Ms	Q2
	Et	H	Cl	CHMeOMe	Ms	Q3
	Et	H	Cl	CHMeOEt	Ms	H
	Et	H	Cl	CHMeOEt	Cl	H
30	Et	H	Cl	CHMeOEt	MeS	H
	Et	H	Cl	CHMeOEt	MeSO	H
	Et	H	Cl	CHMeOEt	Ms	Q1
	Et	H	Cl	CHMeOEt	Ms	Q2
	Et	H	Cl	CHMeOEt	Ms	Q3
35	Et	H	Cl	CHMeOPr-i	Ms	H
	Et	H	Cl	CHMeOPr-i	Cl	H
	Et	H	Cl	CHMeOPr-i	MeS	H
	Et	H	Cl	CHMeOPr-i	MeSO	H
40	Et	H	Cl	CHMeOPr-n	Ms	H
	Et	H	Cl	$\text{CHMeOCH}=\text{CH}_2$	Ms	H
	Et	H	Cl	$\text{CHMeOCH}=\text{CH}_2$	Ms	H
	Et	H	Cl	$\text{CHMeOCH}_2\text{CH}=\text{CH}_2$	Ms	H
	Et	H	Cl	$\text{CHMeOCH}_2\text{C}\equiv\text{CH}$	Ms	H
45	Et	H	Cl	$\text{CHMeOCH}_2\text{CH}_2\text{Cl}$	Ms	H
	Et	H	Cl	CHMeO-Y5	Ms	H
	Et	H	Cl	CMezOH	Ms	H
	Et	H	Cl	CMezOMe	Ms	H

50

55

55

	A	B	X	Y	Z	Q
5	Et	H	Cl	CHMeO-Y13	Ms	H
	Et	H	Cl	CH ₂ NHMe	Ms	H
	Et	H	Cl	CH ₂ NMe ₂	Ms	H
10	Et	H	Cl	CH ₂ NEtMe	Ms	H
	Et	H	Cl	CH ₂ NEt ₂	Ms	H
	Et	H	Cl	CH ₂ -Y14	Ms	H
	Et	H	Cl	CHMeNMe ₂	Ms	H
	Et	H	Cl	CH ₂ CH ₂ NMe ₂	Ms	H
15	Et	H	Cl	CH ₂ OCH ₂ Ph	Ms	H
	Et	H	Cl	CHMeOCH ₂ Ph	Ms	H
	Et	H	Cl	CH ₂ OCH ₂ CO ₂ Me	Ms	H
	Et	H	Cl	CH ₂ OCH ₂ CO ₂ Et	Ms	H
20	Et	H	Cl	CH ₂ OCHMeCO ₂ Me	Ms	H
	Et	H	Cl	CH ₂ CN	Ms	H
	Et	H	Cl	CHMeCN	Ms	H
	Et	H	Cl	CH ₂ SMe	Ms	H
	Et	H	Cl	CH ₂ SMe	Cl	H
25	Et	H	Cl	CH ₂ SMe	MeS	H
	Et	H	Cl	CH ₂ SMe	MeSO	H
	Et	H	Cl	CH ₂ SEt	Ms	H
	Et	H	Cl	CH ₂ SEt	Cl	H
	Et	H	Cl	CH ₂ SEt	MeS	H
30	Et	H	Cl	CH ₂ SEt	MeSO	H
	Et	H	Cl	CH ₂ SOMe	Ms	H
	Et	H	Cl	CH ₂ SOEt	Ms	H
	Et	H	Cl	CH ₂ SO ₂ Me	Ms	H
35	Et	H	Cl	CH ₂ SO ₂ Me	Cl	H
	Et	H	Cl	CH ₂ SO ₂ Me	MeS	H
	Et	H	Cl	CH ₂ SO ₂ Me	MeSO	H
	Et	H	Cl	CH ₂ SO ₂ Et	Ms	H
	Et	H	Cl	CH ₂ SO ₂ Et	Cl	H
40	Et	H	Cl	CH ₂ SO ₂ Et	MeS	H
	Et	H	Cl	CH ₂ SO ₂ Et	MeSO	H
	Et	H	Cl	CHMeSMe	Ms	H
	Et	H	Cl	CHMeSEt	Ms	H
	Et	H	Cl	CHMeSO ₂ Me	Ms	H
45	Et	H	Cl	CHMeSO ₂ Et	Ms	H
	Et	H	Cl	CH ₂ SCH ₂ CH ₂ OMe	Ms	H
	Et	H	Cl	CH ₂ OCOMe	Ms	H
	Et	H	Cl	CH ₂ OCOEt	Ms	H
50						
55						

	A	B	X	Y	Z	Q
5	Et	H	Cl	CHMeOCCOMe	Ms	H
	Et	H	Cl	CH ₂ OSO ₂ Me	Ms	H
	Et	H	Cl	CH ₂ OSO ₂ Et	Ms	H
	Et	H	Cl	CHMeOSO ₂ Me	Ms	H
10	Pr-i	H	Cl	CH ₂ OH	Ms	H
	Pr-i	H	Cl	CH ₂ OMe	Ms	H
	Pr-i	H	Cl	CH ₂ OMe	Cl	H
	Pr-i	H	Cl	CH ₂ OMe	MeS	H
15	Pr-i	H	Cl	CH ₂ OMe	MeSO	H
	Pr-i	H	Cl	CH ₂ OMe	Ms	Q1
	Pr-i	H	Cl	CH ₂ OMe	MeS	Q1
	Pr-i	H	Cl	CH ₂ OMe	MeSO	Q1
	Pr-i	H	Cl	CH ₂ OMe	Ms	Q2
20	Pr-i	H	Cl	CH ₂ OMe	MeS	Q2
	Pr-i	H	Cl	CH ₂ OMe	MeSO	Q2
	Pr-i	H	Cl	CH ₂ OMe	Ms	Q3
	Pr-i	H	Cl	CH ₂ OMe	MeS	Q3
25	Pr-i	H	Cl	CH ₂ OMe	MeSO	Q3
	Pr-i	H	Cl	CH ₂ OMe	Ms	Q4
	Pr-i	H	Cl	CH ₂ OMe	Ms	Q5
	Pr-i	H	Cl	CH ₂ OMe	Ms	Q6
	Pr-i	H	Cl	CH ₂ OMe	Ms	Q7
30	Pr-i	H	Cl	CH ₂ OMe	Ms	Q8
	Pr-i	H	Cl	CH ₂ OMe	Ms	Q9
	Pr-i	H	Cl	CH ₂ OEt	Ms	H
	Pr-i	H	Cl	CH ₂ OEt	Cl	H
	Pr-i	H	Cl	CH ₂ OEt	MeS	H
35	Pr-i	H	Cl	CH ₂ OEt	MeSO	H
	Pr-i	H	Cl	CH ₂ OEt	Ms	Q1
	Pr-i	H	Cl	CH ₂ OEt	MeS	Q1
	Pr-i	H	Cl	CH ₂ OEt	MeSO	Q1
40	Pr-i	H	Cl	CH ₂ OEt	Ms	Q2
	Pr-i	H	Cl	CH ₂ OEt	MeS	Q2
	Pr-i	H	Cl	CH ₂ OEt	MeSO	Q2
	Pr-i	H	Cl	CH ₂ OEt	Ms	Q3
	Pr-i	H	Cl	CH ₂ OEt	MeS	Q3
45	Pr-i	H	Cl	CH ₂ OEt	MeSO	Q3
	Pr-i	H	Cl	CH ₂ OEt	Ms	Q4
	Pr-i	H	Cl	CH ₂ OEt	Ms	Q5
	Pr-i	H	Cl	CH ₂ OEt	Ms	Q6

50

55

	A	B	X	Y	Z	Q
5	Pr-i	H	Cl	CH ₂ OEt	Ms	Q7
	Pr-i	H	Cl	CH ₂ OEt	Ms	Q8
	Pr-i	H	Cl	CH ₂ OEt	Ms	Q9
10	Pr-i	H	Cl	CH ₂ OPr-i	Ms	H
	Pr-i	H	Cl	CH ₂ OPr-i	Cl	H
	Pr-i	H	Cl	CH ₂ OPr-i	MeS	H
	Pr-i	H	Cl	CH ₂ OPr-i	MeSO	H
	Pr-i	H	Cl	CH ₂ OPr-i	Ms	Q1
15	Pr-i	H	Cl	CH ₂ OPr-i	Ms	Q2
	Pr-i	H	Cl	CH ₂ OPr-i	Ms	Q3
	Pr-i	H	Cl	CH ₂ OPr-n	Ms	H
	Pr-i	H	Cl	CH ₂ OPr-n	Cl	H
20	Pr-i	H	Cl	CH ₂ OPr-n	MeS	H
	Pr-i	H	Cl	CH ₂ OPr-n	MeSO	H
	Pr-i	H	Cl	CH ₂ OCH=CH ₂	Ms	H
	Pr-i	H	Cl	CH ₂ OCH=CH ₂	Cl	H
	Pr-i	H	Cl	CH ₂ OCH=CH ₂	MeS	H
25	Pr-i	H	Cl	CH ₂ OCH=CH ₂	MeSO	H
	Pr-i	H	Cl	CH ₂ OCH ₂ CH=CH ₂	Ms	H
	Pr-i	H	Cl	CH ₂ OCH ₂ CH=CH ₂	Cl	H
	Pr-i	H	Cl	CH ₂ OCH ₂ CH=CH ₂	MeS	H
30	Pr-i	H	Cl	CH ₂ OCH ₂ CH=CH ₂	MeSO	H
	Pr-i	H	Cl	CH ₂ OCH ₂ C≡CH	Ms	H
	Pr-i	H	Cl	CH ₂ OCH ₂ C≡CH	Cl	H
	Pr-i	H	Cl	CH ₂ OCH ₂ C≡CH	MeS	H
	Pr-i	H	Cl	CH ₂ OCH ₂ C≡CH	MeSO	H
35	Pr-i	H	Cl	CH ₂ OCH ₂ CH ₂ Cl	Ms	H
	Pr-i	H	Cl	CH ₂ OCH ₂ CH ₂ Cl	Cl	H
	Pr-i	H	Cl	CH ₂ OCH ₂ CH ₂ Cl	MeS	H
	Pr-i	H	Cl	CH ₂ OCH ₂ CH ₂ Cl	MeSO	H
	Pr-i	H	Cl	CH ₂ OCH ₂ CH ₂ Br	Ms	H
40	Pr-i	H	Cl	CH ₂ OCH ₂ CH ₂ CN	Ms	H
	Pr-i	H	Cl	CH ₂ OAm-n	Ms	H
	Pr-i	H	Cl	CH ₂ O-Y5	Ms	H
	Pr-i	H	Cl	CHMeOH	Ms	H
45	Pr-i	H	Cl	CHMeOMe	Ms	H
	Pr-i	H	Cl	CHMeOMe	Cl	H
	Pr-i	H	Cl	CHMeOMe	MeS	H
	Pr-i	H	Cl	CHMeOMe	MeSO	H
	Pr-i	H	Cl	CHMeOMe	Ms	Q1

50

55

	A	B	X	Y	Z	Q
5	Pr-i	H	Cl	CHMeOMe	Ms	Q2
	Pr-i	H	Cl	CHMeOMe	Ms	Q3
	Pr-i	H	Cl	CHMeOEt	Ms	H
	Pr-i	H	Cl	CHMeOEt	Cl	H
10	Pr-i	H	Cl	CHMeOEt	MeS	H
	Pr-i	H	Cl	CHMeOEt	MeSO	H
	Pr-i	H	Cl	CHMeOEt	Ms	Q1
	Pr-i	H	Cl	CHMeOEt	Ms	Q2
15	Pr-i	H	Cl	CHMeOEt	Ms	Q3
	Pr-i	H	Cl	CHMeOPr-i	Ms	H
	Pr-i	H	Cl	CHMeOPr-i	Cl	H
	Pr-i	H	Cl	CHMeOPr-i	MeS	H
	Pr-i	H	Cl	CHMeOPr-i	MeSO	H
20	Pr-i	H	Cl	CHMeOPr-n	Ms	H
	Pr-i	H	Cl	CHMeOCH=CH ₂	Ms	H
	Pr-i	H	Cl	CHMeOCH=CH ₂	Ms	H
	Pr-i	H	Cl	CHMeOCH ₂ CH=CH ₂	Ms	H
25	Pr-i	H	Cl	CHMeOCH ₂ C≡CH	Ms	H
	Pr-i	H	Cl	CHMeOCH ₂ CH ₂ Cl	Ms	H
	Pr-i	H	Cl	CHMeO-Y5	Ms	H
	Pr-i	H	Cl	CMe ₂ OH	Ms	H
	Pr-i	H	Cl	CMe ₂ OMe	Ms	H
30	Pr-i	H	Cl	CMe ₂ OMe	Cl	H
	Pr-i	H	Cl	CMe ₂ OMe	MeS	H
	Pr-i	H	Cl	CMe ₂ OMe	MeSO	H
	Pr-i	H	Cl	CMe ₂ OEt	Ms	H
	Pr-i	H	Cl	CMe ₂ OEt	Cl	H
35	Pr-i	H	Cl	CMe ₂ OEt	MeS	H
	Pr-i	H	Cl	CMe ₂ OEt	MeSO	H
	Pr-i	H	Cl	CMe ₂ OPr-i	Ms	H
	Pr-i	H	Cl	CH ₂ CH ₂ OMe	Ms	H
40	Pr-i	H	Cl	CH ₂ CH ₂ OMe	Cl	H
	Pr-i	H	Cl	CH ₂ CH ₂ OMe	MeS	H
	Pr-i	H	Cl	CH ₂ CH ₂ OMe	MeSO	H
	Pr-i	H	Cl	CH ₂ CH ₂ OEt	Ms	H
	Pr-i	H	Cl	CH ₂ CH ₂ OEt	Cl	H
45	Pr-i	H	Cl	CH ₂ CH ₂ OEt	MeS	H
	Pr-i	H	Cl	CH ₂ CH ₂ OEt	MeSO	H
	Pr-i	H	Cl	CH ₂ CH ₂ OPr-i	Ms	H
	Pr-i	H	Cl	CH ₂ CH ₂ OPr-i	Cl	H

50

55

	A	B	X	Y	Z	Q
5	Pr-i	H	Cl	CH ₂ CH ₂ OPr-i	MeS	H
	Pr-i	H	Cl	CH ₂ CH ₂ OPr-i	MeSO	H
	Pr-i	H	Cl	CH ₂ OH	Ms	H
	Pr-i	H	Cl	CH ₂ OMe	Ms	H
10	Pr-i	H	Cl	CH ₂ OMe	Cl	H
	Pr-i	H	Cl	CH ₂ OMe	MeS	H
	Pr-i	H	Cl	CH ₂ OMe	MeSO	H
	Pr-i	H	Cl	CH ₂ OE _t	Ms	H
15	Pr-i	H	Cl	CH ₂ OPr-i	Ms	H
	Pr-i	H	Cl	CH ₂ OCH ₂ CH ₂ OMe	Ms	H
	Pr-i	H	Cl	CH ₂ OCH ₂ CH ₂ OMe	Cl	H
	Pr-i	H	Cl	CH ₂ OCH ₂ CH ₂ OMe	MeS	H
	Pr-i	H	Cl	CH ₂ OCH ₂ CH ₂ OMe	MeSO	H
20	Pr-i	H	Cl	CH ₂ OCH ₂ CH ₂ OE _t	Ms	H
	Pr-i	H	Cl	CHMeOCH ₂ CH ₂ OMe	Ms	H
	Pr-i	H	Cl	CH ₂ O-Y8	Ms	H
	Pr-i	H	Cl	CH ₂ O-Y9	Ms	H
25	Pr-i	H	Cl	CH ₂ O-Y10	Ms	H
	Pr-i	H	Cl	CHMeO-Y8	Ms	H
	Pr-i	H	Cl	CHMeO-Y9	Ms	H
	Pr-i	H	Cl	CHMeO-Y10	Ms	H
	Pr-i	H	Cl	CH ₂ O-Y13	Ms	H
30	Pr-i	H	Cl	CHMeO-Y13	Ms	H
	Pr-i	H	Cl	CH ₂ NHMe	Ms	H
	Pr-i	H	Cl	CH ₂ NMe ₂	Ms	H
	Pr-i	H	Cl	CH ₂ NEtMe	Ms	H
	Pr-i	H	Cl	CH ₂ NEt ₂	Ms	H
35	Pr-i	H	Cl	CH ₂ -Y14	Ms	H
	Pr-i	H	Cl	CHMeNMe ₂	Ms	H
	Pr-i	H	Cl	CH ₂ CH ₂ NMe ₂	Ms	H
	Pr-i	H	Cl	CH ₂ OCH ₂ Ph	Ms	H
40	Pr-i	H	Cl	CHMeOCH ₂ Ph	Ms	H
	Pr-i	H	Cl	CH ₂ OCH ₂ CO ₂ Me	Ms	H
	Pr-i	H	Cl	CH ₂ OCH ₂ CO ₂ Et	Ms	H
	Pr-i	H	Cl	CH ₂ OCHMeCO ₂ Me	Ms	H
	Pr-i	H	Cl	CH ₂ CN	Ms	H
45	Pr-i	H	Cl	CHMeCN	Ms	H
	Pr-i	H	Cl	CH ₂ SMe	Ms	H
	Pr-i	H	Cl	CH ₂ SMe	Cl	H
	Pr-i	H	Cl	CH ₂ SMe	MeS	H
50						
55						

	A	B	X	Y	Z	Q
5	Pr-i	H	Cl	CH ₂ SMe	MeSO	H
	Pr-i	H	Cl	CH ₂ SEt	Ms	H
	Pr-i	H	Cl	CH ₂ SEt	Cl	H
	Pr-i	H	Cl	CH ₂ SEt	MeS	H
10	Pr-i	H	Cl	CH ₂ SEt	MeSO	H
	Pr-i	H	Cl	CH ₂ SOMe	Ms	H
	Pr-i	H	Cl	CH ₂ SOEt	Ms	H
	Pr-i	H	Cl	CH ₂ SO ₂ Me	Ms	H
	Pr-i	H	Cl	CH ₂ SO ₂ Me	Cl	H
15	Pr-i	H	Cl	CH ₂ SO ₂ Me	MeS	H
	Pr-i	H	Cl	CH ₂ SO ₂ Me	MeSO	H
	Pr-i	H	Cl	CH ₂ SO ₂ Et	Ms	H
	Pr-i	H	Cl	CH ₂ SO ₂ Et	Cl	H
20	Pr-i	H	Cl	CH ₂ SO ₂ Et	MeS	H
	Pr-i	H	Cl	CH ₂ SO ₂ Et	MeSO	H
	Pr-i	H	Cl	CHMeSMe	Ms	H
	Pr-i	H	Cl	CHMeSEt	Ms	H
	Pr-i	H	Cl	CHMeSO ₂ Me	Ms	H
25	Pr-i	H	Cl	CHMeSO ₂ Et	Ms	H
	Pr-i	H	Cl	CH ₂ SCH ₂ CH ₂ OMe	Ms	H
	Pr-i	H	Cl	CH ₂ OCOMe	Ms	H
	Pr-i	H	Cl	CH ₂ OCOEt	Ms	H
	Pr-i	H	Cl	CHMeOCOMe	Ms	H
30	Pr-i	H	Cl	CH ₂ OSO ₂ Me	Ms	H
	Pr-i	H	Cl	CH ₂ OSO ₂ Et	Ms	H
	Pr-i	H	Cl	CHMeOSO ₂ Me	Ms	H

35

40

45

50

55

	A	B	X	Y	Z	Q
5	Me	H	MeO	CH ₂ OH	Ms	H
	Me	H	MeO	CH ₂ OMe	Ms	H
	Me	H	MeO	CH ₂ OMe	Cl	H
	Me	H	MeO	CH ₂ OMe	MeS	H
10	Me	H	MeO	CH ₂ OMe	MeSO	H
	Me	H	MeO	CH ₂ OMe	Ms	Q1
	Me	H	MeO	CH ₂ OMe	MeS	Q1
	Me	H	MeO	CH ₂ OMe	MeSO	Q1
15	Me	H	MeO	CH ₂ OMe	Ms	Q2
	Me	H	MeO	CH ₂ OMe	MeS	Q2
	Me	H	MeO	CH ₂ OMe	MeSO	Q2
	Me	H	MeO	CH ₂ OMe	Ms	Q3
	Me	H	MeO	CH ₂ OMe	MeS	Q3
20	Me	H	MeO	CH ₂ OMe	MeSO	Q3
	Me	H	MeO	CH ₂ OMe	Ms	Q4
	Me	H	MeO	CH ₂ OMe	Ms	Q5
	Me	H	MeO	CH ₂ OMe	Ms	Q6
25	Me	H	MeO	CH ₂ OMe	Ms	Q7
	Me	H	MeO	CH ₂ OMe	Ms	Q8
	Me	H	MeO	CH ₂ OMe	Ms	Q9
	Me	H	MeO	CH ₂ OEt	Ms	H
	Me	H	MeO	CH ₂ OEt	Cl	H
30	Me	H	MeO	CH ₂ OEt	MeS	H
	Me	H	MeO	CH ₂ OEt	MeSO	H
	Me	H	MeO	CH ₂ OEt	Ms	Q1
	Me	H	MeO	CH ₂ OEt	MeS	Q1
	Me	H	MeO	CH ₂ OEt	MeSO	Q1
35	Me	H	MeO	CH ₂ OEt	Ms	Q2
	Me	H	MeO	CH ₂ OEt	MeS	Q2
	Me	H	MeO	CH ₂ OEt	MeSO	Q2
	Me	H	MeO	CH ₂ OEt	Ms	Q3
	Me	H	MeO	CH ₂ OEt	MeS	Q3
40	Me	H	MeO	CH ₂ OEt	MeSO	Q3
	Me	H	MeO	CH ₂ OEt	Ms	Q4
	Me	H	MeO	CH ₂ OEt	Ms	Q5
	Me	H	MeO	CH ₂ OEt	Ms	Q6
45	Me	H	MeO	CH ₂ OEt	Ms	Q7
	Me	H	MeO	CH ₂ OEt	Ms	Q8
	Me	H	MeO	CH ₂ OEt	Ms	Q9
	Me	H	MeO	CH ₂ OPr-i	Ms	H
50						
55						

	A	E	X	Y	Z	Q
5	Me	H	MeO	CH ₂ OPr-i	Cl	H
	Me	H	MeO	CH ₂ OPr-i	MeS	H
	Me	H	MeO	CH ₂ OPr-i	MeSO	H
	Me	H	MeO	CH ₂ OPr-i	Ms	Q1
10	Me	H	MeO	CH ₂ OPr-i	Ms	Q2
	Me	H	MeO	CH ₂ OPr-i	Ms	Q3
	Me	H	MeO	CH ₂ OPr-n	Ms	H
	Me	H	MeO	CH ₂ OPr-n	Cl	H
	Me	H	MeO	CH ₂ OPr-n	MeS	H
15	Me	H	MeO	CH ₂ OPr-n	MeSO	H
	Me	H	MeO	CH ₂ OCH=CH ₂	Ms	H
	Me	H	MeO	CH ₂ OCH=CH ₂	Cl	H
	Me	H	MeO	CH ₂ OCH=CH ₂	MeS	H
20	Me	H	MeO	CH ₂ OCH=CH ₂	MeSO	H
	Me	H	MeO	CH ₂ OCH ₂ CH=CH ₂	Ms	H
	Me	H	MeO	CH ₂ OCH ₂ CH=CH ₂	Cl	H
	Me	H	MeO	CH ₂ OCH ₂ CH=CH ₂	MeS	H
	Me	H	MeO	CH ₂ OCH ₂ CH=CH ₂	MeSO	H
25	Me	H	MeO	CH ₂ OCH ₂ C≡CH	Ms	H
	Me	H	MeO	CH ₂ OCH ₂ C≡CH	Cl	H
	Me	H	MeO	CH ₂ OCH ₂ C≡CH	MeS	H
	Me	H	MeO	CH ₂ OCH ₂ C≡CH	MeSO	H
30	Me	H	MeO	CH ₂ OCH ₂ CH ₂ Cl	Ms	H
	Me	H	MeO	CH ₂ OCH ₂ CH ₂ Cl	Cl	H
	Me	H	MeO	CH ₂ OCH ₂ CH ₂ Cl	MeS	H
	Me	H	MeO	CH ₂ OCH ₂ CH ₂ Cl	MeSO	H
	Me	H	MeO	CH ₂ O-Y5	Ms	H
35	Me	H	MeO	CHMeOH	Ms	H
	Me	H	MeO	CHMeOMe	Ms	H
	Me	H	MeO	CHMeOMe	Cl	H
	Me	H	MeO	CHMeOMe	MeS	H
	Me	H	MeO	CHMeOMe	MeSO	H
40	Me	H	MeO	CHMeOMe	Ms	Q1
	Me	H	MeO	CHMeOMe	Ms	Q2
	Me	H	MeO	CHMeOMe	Ms	Q3
	Me	H	MeO	CHMeOE t	Ms	H
45	Me	H	MeO	CHMeOE t	Cl	H
	Me	H	MeO	CHMeOE t	MeS	H
	Me	H	MeO	CHMeOE t	MeSO	H
	Me	H	MeO	CHMeOE t	Ms	Q1

50

55

	A	B	X	Y	Z	Q
5	Me	H	MeO	CHMeOEt	Ms	Q2
	Me	H	MeO	CHMeOEt	Ms	Q3
	Me	H	MeO	CHMeOPr-i	Ms	H
	Me	H	MeO	CHMeOPr-i	Cl	H
	Me	H	MeO	CHMeOPr-i	MeS	H
10	Me	H	MeO	CHMeOPr-i	MeSO	H
	Me	H	MeO	CHMeOPr-u	Ms	H
	Me	H	MeO	CHMeOCH=CH ₂	Ms	H
	Me	H	MeO	CHMeOCH=CH ₂	Ms	H
15	Me	H	MeO	CHMeOCH ₂ CH=CH ₂	Ms	H
	Me	H	MeO	CHMeOCH ₂ C≡CH	Ms	H
	Me	H	MeO	CHMeOCH ₂ CH ₂ Cl	Ms	H
	Me	H	MeO	CHMeO-Y5	Ms	H
	Me	H	MeO	CMe ₂ OH	Ms	H
20	Me	H	MeO	CMe ₂ OMe	Ms	H
	Me	H	MeO	CMe ₂ OMe	Cl	H
	Me	H	MeO	CMe ₂ OMe	MeS	H
	Me	H	MeO	CMe ₂ OMe	MeSO	H
25	Me	H	MeO	CMe ₂ OEt	Ms	H
	Me	H	MeO	CMe ₂ OEt	Cl	H
	Me	H	MeO	CMe ₂ OEt	MeS	H
	Me	H	MeO	CMe ₂ OEt	MeSO	H
	Me	H	MeO	CMe ₂ OPr-i	Ms	H
30	Me	H	MeO	CH ₂ CH ₂ OMe	Ms	H
	Me	H	MeO	CH ₂ CH ₂ OMe	Cl	H
	Me	H	MeO	CH ₂ CH ₂ OMe	MeS	H
	Me	H	MeO	CH ₂ CH ₂ OMe	MeSO	H
35	Me	H	MeO	CH ₂ CH ₂ OEt	Ms	H
	Me	H	MeO	CH ₂ CH ₂ OEt	Cl	H
	Me	H	MeO	CH ₂ CH ₂ OEt	MeS	H
	Me	H	MeO	CH ₂ CH ₂ OEt	MeSO	H
	Me	H	MeO	CH ₂ CH ₂ OPr-i	Ms	H
40	Me	H	MeO	CH ₂ CH ₂ OPr-i	Cl	H
	Me	H	MeO	CH ₂ CH ₂ OPr-i	MeS	H
	Me	H	MeO	CH ₂ CH ₂ OPr-i	MeSO	H
	Me	H	MeO	CH ₂ CH ₂ OPr-i	Ms	H
45	Me	H	MeO	CH ₂ CH ₂ OPr-i	Ms	H
	Me	H	MeO	CH ₂ CH ₂ OPr-i	Cl	H
	Me	H	MeO	CH ₂ CH ₂ OPr-i	MeS	H
	Me	H	MeO	CH ₂ CH ₂ OPr-i	MeSO	H

50

55

	A	B	X	Y	Z	G
5	Me	H	MeO	CHEtOE t	Ms	H
	Me	H	MeO	CHEtOP _T -i	Ms	H
	Me	H	MeO	CH ₂ OCH ₂ CH ₂ OMe	Ms	H
	Me	H	MeO	CH ₂ OCH ₂ CH ₂ OMe	Cl	H
10	Me	H	MeO	CH ₂ OCH ₂ CH ₂ OMe	MeS	H
	Me	H	MeO	CH ₂ OCH ₂ CH ₂ OMe	MeSO	H
	Me	H	MeO	CH ₂ OCH ₂ CH ₂ OE t	Ms	H
	Me	H	MeO	CHMeOCH ₂ CH ₂ OMe	Ms	H
15	Me	H	MeO	CH ₂ O-Y8	Ms	H
	Me	H	MeO	CH ₂ O-Y9	Ms	H
	Me	H	MeO	CH ₂ O-Y10	Ms	H
	Me	H	MeO	CHMeO-Y8	Ms	H
	Me	H	MeO	CHMeO-Y9	Ms	H
20	Me	H	MeO	CHMeO-Y10	Ms	H
	Me	H	MeO	CH ₂ O-Y13	Ms	H
	Me	H	MeO	CHMeO-Y13	Ms	H
	Me	H	MeO	CH ₂ NHMe	Ms	H
25	Me	H	MeO	CH ₂ NMe ₂	Ms	H
	Me	H	MeO	CH ₂ NE tMe	Ms	H
	Me	H	MeO	CH ₂ NE t ₂	Ms	H
	Me	H	MeO	CH ₂ -Y14	Ms	H
	Me	H	MeO	CHMeNMe ₂	Ms	H
30	Me	H	MeO	CH ₂ CH ₂ NMe ₂	Ms	H
	Me	H	MeO	CH ₂ OCH ₂ Ph	Ms	H
	Me	H	MeO	CHMeOCH ₂ Ph	Ms	H
	Me	H	MeO	CH ₂ OCH ₂ CO ₂ Me	Ms	H
	Me	H	MeO	CH ₂ OCH ₂ CO ₂ Et	Ms	H
35	Me	H	MeO	CH ₂ OCHMeCO ₂ Me	Ms	H
	Me	H	MeO	CH ₂ CN	Ms	H
	Me	H	MeO	CHMeCN	Ms	H
	Me	H	MeO	CH ₂ SMe	Ms	H
40	Me	H	MeO	CH ₂ SMe	Cl	H
	Me	H	MeO	CH ₂ SMe	MeS	H
	Me	H	MeO	CH ₂ SMe	MeSO	H
	Me	H	MeO	CH ₂ SE t	Ms	H
	Me	H	MeO	CH ₂ SE t	Cl	H
45	Me	H	MeO	CH ₂ SE t	MeS	H
	Me	H	MeO	CH ₂ SE t	MeSO	H
	Me	H	MeO	CH ₂ SOMe	Ms	H
	Me	H	MeO	CH ₂ SOEt	Ms	H

50

55

	A	B	X	Y	Z	Q
5	Me	H	MeO	CH ₂ SO ₂ Me	Ms	H
	Me	H	MeO	CH ₂ SO ₂ Me	Cl	H
	Me	H	MeO	CH ₂ SO ₂ Me	MeS	H
	Me	H	MeO	CH ₂ SO ₂ Me	MeSO	H
10	Me	H	MeO	CH ₂ SO ₂ Et	Ms	H
	Me	H	MeO	CH ₂ SO ₂ Et	Cl	H
	Me	H	MeO	CH ₂ SO ₂ Et	MeS	H
	Me	H	MeO	CH ₂ SO ₂ Et	MeSO	H
15	Me	H	MeO	CHMeSMe	Ms	H
	Me	H	MeO	CHMeSEt	Ms	H
	Me	H	MeO	CHMeSO ₂ Me	Ms	H
	Me	H	MeO	CHMeSO ₂ Et	Ms	H
	Me	H	MeO	CH ₂ SCH ₂ CH ₂ OMe	Ms	H
20	Me	H	MeO	CH ₂ OCOMe	Ms	H
	Me	H	MeO	CH ₂ OCOEt	Ms	H
	Me	H	MeO	CHMeOCOMe	Ms	H
	Me	H	MeO	CH ₂ OSO ₂ Me	Ms	H
	Me	H	MeO	CH ₂ OSO ₂ Et	Ms	H
25	Me	H	MeO	CHMeOSO ₂ Me	Ms	H
	Et	H	MeO	CH ₂ OH	Ms	H
	Et	H	MeO	CH ₂ OMe	Ms	H
	Et	H	MeO	CH ₂ OMe	Cl	H
30	Et	H	MeO	CH ₂ OMe	MeS	H
	Et	H	MeO	CH ₂ OMe	MeSO	H
	Et	H	MeO	CH ₂ OMe	Ms	Q1
	Et	H	MeO	CH ₂ OMe	MeS	Q1
	Et	H	MeO	CH ₂ OMe	MeSO	Q1
35	Et	H	MeO	CH ₂ OMe	Ms	Q2
	Et	H	MeO	CH ₂ OMe	MeS	Q2
	Et	H	MeO	CH ₂ OMe	MeSO	Q2
	Et	H	MeO	CH ₂ OMe	Ms	Q3
40	Et	H	MeO	CH ₂ OMe	MeS	Q3
	Et	H	MeO	CH ₂ OMe	MeSO	Q3
	Et	H	MeO	CH ₂ OMe	Ms	Q4
	Et	H	MeO	CH ₂ OMe	Ms	Q5
	Et	H	MeO	CH ₂ OMe	Ms	Q6
45	Et	H	MeO	CH ₂ OMe	Ms	Q7
	Et	H	MeO	CH ₂ OMe	Ms	Q8
	Et	H	MeO	CH ₂ OMe	Ms	Q9
	Et	H	MeO	CH ₂ OEt	Ms	H
50						
55						

	A	E	X	Y	Z	Q
5	Et	H	MeO	CH ₂ OEt	Cl	H
	Et	H	MeO	CH ₂ OEt	MeS	H
	Et	H	MeO	CH ₂ OEt	MeSO	H
10	Et	H	MeO	CH ₂ OEt	Ms	Q1
	Et	H	MeO	CH ₂ OEt	MeS	Q1
	Et	H	MeO	CH ₂ OEt	MeSO	Q1
	Et	H	MeO	CH ₂ OEt	Ms	Q2
	Et	H	MeO	CH ₂ OEt	MeS	Q2
15	Et	H	MeO	CH ₂ OEt	MeSO	Q2
	Et	H	MeO	CH ₂ OEt	Ms	Q3
	Et	H	MeO	CH ₂ OEt	MeS	Q3
	Et	H	MeO	CH ₂ OEt	MeSO	Q3
20	Et	H	MeO	CH ₂ OEt	Ms	Q4
	Et	H	MeO	CH ₂ OEt	Ms	Q5
	Et	H	MeO	CH ₂ OEt	Ms	Q6
	Et	H	MeO	CH ₂ OEt	Ms	Q7
	Et	H	MeO	CH ₂ OEt	Ms	Q8
25	Et	H	MeO	CH ₂ OEt	Ms	Q9
	Et	H	MeO	CH ₂ OPr-i	Ms	H
	Et	H	MeO	CH ₂ OPr-i	Cl	H
	Et	H	MeO	CH ₂ OPr-i	MeS	H
	Et	H	MeO	CH ₂ OPr-i	MeSO	H
30	Et	H	MeO	CH ₂ OPr-i	Ms	Q1
	Et	H	MeO	CH ₂ OPr-i	Ms	Q2
	Et	H	MeO	CH ₂ OPr-i	Ms	Q3
	Et	H	MeO	CH ₂ OPr-n	Ms	H
	Et	H	MeO	CH ₂ OPr-n	Cl	H
35	Et	H	MeO	CH ₂ OPr-n	MeS	H
	Et	H	MeO	CH ₂ OPr-n	MeSO	H
	Et	H	MeO	CH ₂ OCH=CH ₂	Ms	H
	Et	H	MeO	CH ₂ OCH=CH ₂	Cl	H
40	Et	H	MeO	CH ₂ OCH=CH ₂	MeS	H
	Et	H	MeO	CH ₂ OCH=CH ₂	MeSO	H
	Et	H	MeO	CH ₂ OCH ₂ CH=CH ₂	Ms	H
	Et	H	MeO	CH ₂ OCH ₂ CH=CH ₂	Cl	H
	Et	H	MeO	CH ₂ OCH ₂ CH=CH ₂	MeS	H
45	Et	H	MeO	CH ₂ OCH ₂ CH=CH ₂	MeSO	H
	Et	H	MeO	CH ₂ OCH ₂ C≡CH	Ms	H
	Et	H	MeO	CH ₂ OCH ₂ C≡CH	Cl	H
	Et	H	MeO	CH ₂ OCH ₂ C≡CH	MeS	H

50

55

	A	B	X	Y	Z	Q
5	Et	H	MeO	$\text{CH}_2\text{OCH}_2\text{C}\equiv\text{CH}$	MeSO	H
	Et	H	MeO	$\text{CH}_2\text{OCH}_2\text{CH}_2\text{Cl}$	Ms	H
	Et	H	MeO	$\text{CH}_2\text{OCH}_2\text{CH}_2\text{Cl}$	Cl	H
10	Et	H	MeO	$\text{CH}_2\text{OCH}_2\text{CH}_2\text{Cl}$	MeS	H
	Et	H	MeO	$\text{CH}_2\text{OCH}_2\text{CH}_2\text{Cl}$	MeSO	H
	Et	H	MeO	$\text{CH}_2\text{O}-\text{Y5}$	Ms	H
	Et	H	MeO	CHMeOH	Ms	H
	Et	H	MeO	CHMeOMe	Ms	H
15	Et	H	MeO	CHMeOMe	Cl	H
	Et	H	MeO	CHMeOMe	MeS	H
	Et	H	MeO	CHMeOMe	MeSO	H
	Et	H	MeO	CHMeOMe	Ms	Q1
	Et	H	MeO	CHMeOMe	Ms	Q2
20	Et	H	MeO	CHMeOMe	Ms	Q3
	Et	H	MeO	CHMeOEt	Ms	H
	Et	H	MeO	CHMeOEt	Cl	H
	Et	H	MeO	CHMeOEt	MeS	H
25	Et	H	MeO	CHMeOEt	MeSO	H
	Et	H	MeO	CHMeOEt	Ms	Q1
	Et	H	MeO	CHMeOEt	Ms	Q2
	Et	H	MeO	CHMeOEt	Ms	Q3
	Et	H	MeO	CHMeOPr-i	Ms	H
30	Et	H	MeO	CHMeOPr-i	Cl	H
	Et	H	MeO	CHMeOPr-i	MeS	H
	Et	H	MeO	CHMeOPr-i	MeSO	H
	Et	H	MeO	CHMeOPr-n	Ms	H
	Et	H	MeO	CHMeOCH=CH ₂	Ms	H
35	Et	H	MeO	CHMeOCH=CH ₂	Ms	H
	Et	H	MeO	$\text{CHMeOCH}_2\text{CH}=\text{CH}_2$	Ms	H
	Et	H	MeO	$\text{CHMeOCH}_2\text{C}\equiv\text{CH}$	Ms	H
	Et	H	MeO	$\text{CHMeOCH}_2\text{CH}_2\text{Cl}$	Ms	H
40	Et	H	MeO	CHMeO-Y5	Ms	H
	Et	H	MeO	CMe ₂ OH	Ms	H
	Et	H	MeO	CMe ₂ OMe	Ms	H
	Et	H	MeO	CMe ₂ OMe	Cl	H
	Et	H	MeO	CMe ₂ OMe	MeS	H
45	Et	H	MeO	CMe ₂ OMe	MeSO	H
	Et	H	MeO	CMe ₂ OEt	Ms	H
	Et	H	MeO	CMe ₂ OEt	Cl	H
	Et	H	MeO	CMe ₂ OEt	MeS	H

50

55

	A	B	X	Y	Z	C
5	Et	H	MeO	CMe ₂ OEt	MeSO	H
	Et	H	MeO	CMe ₂ OPr-i	Ms	H
	Et	H	MeO	CH ₂ CH ₂ OMe	Ms	H
	Et	H	MeO	CH ₂ CH ₂ OMe	Cl	H
10	Et	H	MeO	CH ₂ CH ₂ OMe	MeS	H
	Et	H	MeO	CH ₂ CH ₂ OMe	MeSO	H
	Et	H	MeO	CH ₂ CH ₂ OEt	Ms	H
	Et	H	MeO	CH ₂ CH ₂ OEt	Cl	H
15	Et	H	MeO	CH ₂ CH ₂ OEt	MeS	H
	Et	H	MeO	CH ₂ CH ₂ OEt	MeSO	H
	Et	H	MeO	CH ₂ CH ₂ OPr-i	Ms	H
	Et	H	MeO	CH ₂ CH ₂ OPr-i	Cl	H
20	Et	H	MeO	CH ₂ CH ₂ OPr-i	MeS	H
	Et	H	MeO	CH ₂ CH ₂ OPr-i	MeSO	H
	Et	H	MeO	CH ₂ OH	Ms	H
	Et	H	MeO	CH ₂ OMe	Ms	H
	Et	H	MeO	CH ₂ OMe	Cl	H
25	Et	H	MeO	CH ₂ OMe	MeS	H
	Et	H	MeO	CH ₂ OMe	MeSO	H
	Et	H	MeO	CH ₂ OEt	Ms	H
	Et	H	MeO	CH ₂ OPr-i	Ms	H
	Et	H	MeO	CH ₂ OCH ₂ CH ₂ OMe	Ms	H
30	Et	H	MeO	CH ₂ OCH ₂ CH ₂ OMe	Cl	H
	Et	H	MeO	CH ₂ OCH ₂ CH ₂ OMe	MeS	H
	Et	H	MeO	CH ₂ OCH ₂ CH ₂ OMe	MeSO	H
	Et	H	MeO	CH ₂ OCH ₂ CH ₂ OEt	Ms	H
	Et	H	MeO	CHMeOCH ₂ CH ₂ OMe	Ms	H
35	Et	H	MeO	CH ₂ O-Y8	Ms	H
	Et	H	MeO	CH ₂ O-Y9	Ms	H
	Et	H	MeO	CH ₂ O-Y10	Ms	H
	Et	H	MeO	CHMeO-Y8	Ms	H
	Et	H	MeO	CHMeO-Y9	Ms	H
40	Et	H	MeO	CHMeO-Y10	Ms	H
	Et	H	MeO	CH ₂ O-Y13	Ms	H
	Et	H	MeO	CHMeO-Y13	Ms	H
	Et	H	MeO	CH ₂ NHMe	Ms	H
45	Et	H	MeO	CH ₂ NMe ₂	Ms	H
	Et	H	MeO	CH ₂ NEtMe	Ms	H
	Et	H	MeO	CH ₂ NEt ₂	Ms	H
	Et	H	MeO	CH ₂ -Y14	Ms	H

	A	B	X	Y	Z	Q
5	Et	H	MeO	CHMeNMe ₂	Ms	H
	Et	H	MeO	CH ₂ CH ₂ NMe ₂	Ms	H
	Et	H	MeO	CH ₂ OCH ₂ Ph	Ms	H
10	Et	H	MeO	CHMeOCH ₂ Ph	Ms	H
	Et	H	MeO	CH ₂ OCH ₂ CO ₂ Me	Ms	H
	Et	H	MeO	CH ₂ OCH ₂ CO ₂ Et	Ms	H
	Et	H	MeO	CH ₂ OCHMeCO ₂ Me	Ms	H
	Et	H	MeO	CH ₂ CN	Ms	H
15	Et	H	MeO	CHMeCN	Ms	H
	Et	H	MeO	CH ₂ SMe	Ms	H
	Et	H	MeO	CH ₂ SMe	Cl	H
	Et	H	MeO	CH ₂ SMe	MeS	H
	Et	H	MeO	CH ₂ SMe	MeSO	H
20	Et	H	MeO	CH ₂ SEt	Ms	H
	Et	H	MeO	CH ₂ SEt	Cl	H
	Et	H	MeO	CH ₂ SEt	MeS	H
	Et	H	MeO	CH ₂ SEt	MeSO	H
25	Et	H	MeO	CH ₂ SOMe	Ms	H
	Et	H	MeO	CH ₂ SOEt	Ms	H
	Et	H	MeO	CH ₂ SO ₂ Me	Ms	H
	Et	H	MeO	CH ₂ SO ₂ Me	Cl	H
	Et	H	MeO	CH ₂ SO ₂ Me	MeS	H
30	Et	H	MeO	CH ₂ SO ₂ Me	MeSO	H
	Et	H	MeO	CH ₂ SO ₂ Et	Ms	H
	Et	H	MeO	CH ₂ SO ₂ Et	Cl	H
	Et	H	MeO	CH ₂ SO ₂ Et	MeS	H
	Et	H	MeO	CH ₂ SO ₂ Et	MeSO	H
35	Et	H	MeO	CHMeSMe	Ms	H
	Et	H	MeO	CHMeSEt	Ms	H
	Et	H	MeO	CHMeSO ₂ Me	Ms	H
	Et	H	MeO	CHMeSO ₂ Et	Ms	H
40	Et	H	MeO	CH ₂ SCH ₂ CH ₂ OMe	Ms	H
	Et	H	MeO	CH ₂ OCOMe	Ms	H
	Et	H	MeO	CH ₂ OCOEt	Ms	H
	Et	H	MeO	CHMeOCOMe	Ms	H
	Et	H	MeO	CH ₂ OSO ₂ Me	Ms	H
45	Et	H	MeO	CH ₂ OSO ₂ Et	Ms	H
	Et	H	MeO	CHMeOSO ₂ Me	Ms	H
	Pr-i	H	MeO	CH ₂ OH	Ms	H
	Pr-i	H	MeO	CH ₂ OMe	Ms	H
50						
55						

	A	B	X	Y	Z	Q
5	Pr-i	H	MeO	CH ₂ OMe	Cl	H
	Pr-i	H	MeO	CH ₂ OMe	MeS	H
	Pr-i	H	MeO	CH ₂ OMe	MeSO	H
	Pr-i	H	MeO	CH ₂ OMe	Ms	Q1
10	Pr-i	H	MeO	CH ₂ OMe	MeS	Q1
	Pr-i	H	MeO	CH ₂ OMe	MeSO	Q1
	Pr-i	H	MeO	CH ₂ OMe	Ms	Q2
	Pr-i	H	MeO	CH ₂ OMe	MeS	Q2
15	Pr-i	H	MeO	CH ₂ OMe	MeSO	Q2
	Pr-i	H	MeO	CH ₂ OMe	Ms	Q3
	Pr-i	H	MeO	CH ₂ OMe	MeS	Q3
	Pr-i	H	MeO	CH ₂ OMe	MeSO	Q3
	Pr-i	H	MeO	CH ₂ OMe	Ms	Q4
20	Pr-i	H	MeO	CH ₂ OMe	Ms	Q5
	Pr-i	H	MeO	CH ₂ OMe	Ms	Q6
	Pr-i	H	MeO	CH ₂ OMe	Ms	Q7
	Pr-i	H	MeO	CH ₂ OMe	Ms	Q8
25	Pr-i	H	MeO	CH ₂ OMe	Ms	Q9
	Pr-i	H	MeO	CH ₂ OEt	Ms	H
	Pr-i	H	MeO	CH ₂ OEt	Cl	H
	Pr-i	H	MeO	CH ₂ OEt	MeS	H
	Pr-i	H	MeO	CH ₂ OEt	MeSO	H
30	Pr-i	H	MeO	CH ₂ OEt	Ms	Q1
	Pr-i	H	MeO	CH ₂ OEt	MeS	Q1
	Pr-i	H	MeO	CH ₂ OEt	MeSO	Q1
	Pr-i	H	MeO	CH ₂ OEt	Ms	Q2
	Pr-i	H	MeO	CH ₂ OEt	MeS	Q2
35	Pr-i	H	MeO	CH ₂ OEt	MeSO	Q2
	Pr-i	H	MeO	CH ₂ OEt	Ms	Q3
	Pr-i	H	MeO	CH ₂ OEt	MeS	Q3
	Pr-i	H	MeO	CH ₂ OEt	MeSO	Q3
	Pr-i	H	MeO	CH ₂ OEt	Ms	Q4
40	Pr-i	H	MeO	CH ₂ OEt	Ms	Q5
	Pr-i	H	MeO	CH ₂ OEt	Ms	Q6
	Pr-i	H	MeO	CH ₂ OEt	Ms	Q7
	Pr-i	H	MeO	CH ₂ OEt	Ms	Q8
45	Pr-i	H	MeO	CH ₂ OEt	Ms	Q9
	Pr-i	H	MeO	CH ₂ OPr-i	Ms	H
	Pr-i	H	MeO	CH ₂ OPr-i	Cl	H
	Pr-i	H	MeO	CH ₂ OPr-i	MeS	H

50

55

	A	B	X	Y	Z	Q
5	Pr-i	H	MeO	CH ₂ OPr-i	MeSO	H
	Pr-i	H	MeO	CH ₂ OPr-i	Ms	Q1
	Pr-i	H	MeO	CH ₂ OPr-i	Ms	Q2
	Pr-i	H	MeO	CH ₂ OPr-i	Ms	Q3
10	Pr-i	H	MeO	CH ₂ OPr-n	Ms	H
	Pr-i	H	MeO	CH ₂ OPr-n	Cl	H
	Pr-i	H	MeO	CH ₂ OPr-n	MeS	H
	Pr-i	H	MeO	CH ₂ OPr-n	MeSO	H
15	Pr-i	H	MeO	CH ₂ OCH=CH ₂	Ms	H
	Pr-i	H	MeO	CH ₂ OCH=CH ₂	Cl	H
	Pr-i	H	MeO	CH ₂ OCH=CH ₂	MeS	H
	Pr-i	H	MeO	CH ₂ OCH=CH ₂	MeSO	H
	Pr-i	H	MeO	CH ₂ OCH ₂ CH=CH ₂	Ms	H
20	Pr-i	H	MeO	CH ₂ OCH ₂ CH=CH ₂	Cl	H
	Pr-i	H	MeO	CH ₂ OCH ₂ CH=CH ₂	MeS	H
	Pr-i	H	MeO	CH ₂ OCH ₂ CH=CH ₂	MeSO	H
	Pr-i	H	MeO	CH ₂ OCH ₂ C≡CH	Ms	H
25	Pr-i	H	MeO	CH ₂ OCH ₂ C≡CH	Cl	H
	Pr-i	H	MeO	CH ₂ OCH ₂ C≡CH	MeS	H
	Pr-i	H	MeO	CH ₂ OCH ₂ C≡CH	MeSO	H
	Pr-i	H	MeO	CH ₂ OCH ₂ CH ₂ Cl	Ms	H
	Pr-i	H	MeO	CH ₂ OCH ₂ CH ₂ Cl	Cl	H
30	Pr-i	H	MeO	CH ₂ OCH ₂ CH ₂ Cl	MeS	H
	Pr-i	H	MeO	CH ₂ OCH ₂ CH ₂ Cl	MeSO	H
	Pr-i	H	MeO	CH ₂ O-Y5	Ms	H
	Pr-i	H	MeO	CHMeOH	Ms	H
35	Pr-i	H	MeO	CHMeOMe	Ms	H
	Pr-i	H	MeO	CHMeOMe	Cl	H
	Pr-i	H	MeO	CHMeOMe	MeS	H
	Pr-i	H	MeO	CHMeOMe	MeSO	H
	Pr-i	H	MeO	CHMeOMe	Ms	Q1
40	Pr-i	H	MeO	CHMeOMe	Ms	Q2
	Pr-i	H	MeO	CHMeOMe	Ms	Q3
	Pr-i	H	MeO	CHMeOEt	Ms	H
	Pr-i	H	MeO	CHMeOEt	Cl	H
	Pr-i	H	MeO	CHMeOEt	MeS	H
45	Pr-i	H	MeO	CHMeOEt	MeSO	H
	Pr-i	H	MeO	CHMeOEt	Ms	Q1
	Pr-i	H	MeO	CHMeOEt	Ms	Q2
	Pr-i	H	MeO	CHMeOEt	Ms	Q3

50

55

	A	B	X	Y	Z	Q
5	Pr-i	H	MeO	CHMeOPr-i	Ms	H
	Pr-i	H	MeO	CHMeOPr-i	Cl	H
	Pr-i	H	MeO	CHMeOPr-i	MeS	H
	Pr-i	H	MeO	CHMeOPr-i	MeSO	H
10	Pr-i	H	MeO	CHMeOPr-n	Ms	H
	Pr-i	H	MeO	CHMeOCH=CH ₂	Ms	H
	Pr-i	H	MeO	CHMeOCH=CH ₂	Ms	H
	Pr-i	H	MeO	CHMeOCH ₂ CH=CH ₂	Ms	H
15	Pr-i	H	MeO	CHMeOCH ₂ C≡CH	Ms	H
	Pr-i	H	MeO	CHMeOCH ₂ CH ₂ Cl	Ms	H
	Pr-i	H	MeO	CHMeO-Y5	Ms	H
	Pr-i	H	MeO	CMe ₂ OH	Ms	H
	Pr-i	H	MeO	CMe ₂ OMe	Ms	H
20	Pr-i	H	MeO	CMe ₂ OMe	Cl	H
	Pr-i	H	MeO	CMe ₂ OMe	MeS	H
	Pr-i	H	MeO	CMe ₂ OMe	MeSO	H
	Pr-i	H	MeO	CMe ₂ OE _t	Ms	H
25	Pr-i	H	MeO	CMe ₂ OE _t	Cl	H
	Pr-i	H	MeO	CMe ₂ OE _t	MeS	H
	Pr-i	H	MeO	CMe ₂ OE _t	MeSO	H
	Pr-i	H	MeO	CMe ₂ OPr-i	Ms	H
	Pr-i	H	MeO	CH ₂ CH ₂ OMe	Ms	H
30	Pr-i	H	MeO	CH ₂ CH ₂ OMe	Cl	H
	Pr-i	H	MeO	CH ₂ CH ₂ OMe	MeS	H
	Pr-i	H	MeO	CH ₂ CH ₂ OMe	MeSO	H
	Pr-i	H	MeO	CH ₂ CH ₂ OE _t	Ms	H
	Pr-i	H	MeO	CH ₂ CH ₂ OE _t	Cl	H
35	Pr-i	H	MeO	CH ₂ CH ₂ OE _t	MeS	H
	Pr-i	H	MeO	CH ₂ CH ₂ OE _t	MeSO	H
	Pr-i	H	MeO	CH ₂ CH ₂ OPr-i	Ms	H
	Pr-i	H	MeO	CH ₂ CH ₂ OPr-i	Cl	H
40	Pr-i	H	MeO	CH ₂ CH ₂ OPr-i	MeS	H
	Pr-i	H	MeO	CH ₂ CH ₂ OPr-i	MeSO	H
	Pr-i	H	MeO	CH ₂ CH ₂ OH	Ms	H
	Pr-i	H	MeO	CH ₂ CH ₂ OMe	Ms	H
	Pr-i	H	MeO	CH ₂ CH ₂ OMe	Cl	H
45	Pr-i	H	MeO	CH ₂ CH ₂ OMe	MeS	H
	Pr-i	H	MeO	CH ₂ CH ₂ OMe	MeSO	H
	Pr-i	H	MeO	CH ₂ CH ₂ OE _t	Ms	H
	Pr-i	H	MeO	CH ₂ CH ₂ OPr-i	Ms	H

50

55

	A	E	X	Y	Z	Q
5	Pr-i	H	MeO	CH ₂ OCH ₂ CH ₂ OMe	Ms	H
	Pr-i	H	MeO	CH ₂ OCH ₂ CH ₂ OMe	Cl	H
	Pr-i	H	MeO	CH ₂ OCH ₂ CH ₂ OMe	MeS	H
	Pr-i	H	MeO	CH ₂ OCH ₂ CH ₂ OMe	MeSO	H
10	Pr-i	H	MeO	CH ₂ OCH ₂ CH ₂ OEt	Ms	H
	Pr-i	H	MeO	CHMeOCH ₂ CH ₂ OMe	Ms	H
	Pr-i	H	MeO	CH ₂ O-Y8	Ms	H
	Pr-i	H	MeO	CH ₂ O-Y9	Ms	H
15	Pr-i	H	MeO	CH ₂ O-Y10	Ms	H
	Pr-i	H	MeO	CHMeO-Y8	Ms	H
	Pr-i	H	MeO	CHMeO-Y9	Ms	H
	Pr-i	H	MeO	CHMeO-Y10	Ms	H
	Pr-i	H	MeO	CH ₂ O-Y13	Ms	H
20	Pr-i	H	MeO	CHMeO-Y13	Ms	H
	Pr-i	H	MeO	CH ₂ NHMe	Ms	H
	Pr-i	H	MeO	CH ₂ NMe ₂	Ms	H
	Pr-i	H	MeO	CH ₂ NEtMe	Ms	H
25	Pr-i	H	MeO	CH ₂ NEt ₂	Ms	H
	Pr-i	H	MeO	CH ₂ -Y14	Ms	H
	Pr-i	H	MeO	CHMeNMe ₂	Ms	H
	Pr-i	H	MeO	CH ₂ CH ₂ NMe ₂	Ms	H
	Pr-i	H	MeO	CH ₂ OCH ₂ Ph	Ms	H
30	Pr-i	H	MeO	CHMeOCH ₂ Ph	Ms	H
	Pr-i	H	MeO	CH ₂ OCH ₂ CO ₂ Me	Ms	H
	Pr-i	H	MeO	CH ₂ OCH ₂ CO ₂ Et	Ms	H
	Pr-i	H	MeO	CH ₂ OCHMeCO ₂ Me	Ms	H
35	Pr-i	H	MeO	CH ₂ CN	Ms	H
	Pr-i	H	MeO	CHMeCN	Ms	H
	Pr-i	H	MeO	CH ₂ SMe	Ms	H
	Pr-i	H	MeO	CH ₂ SMe	Cl	H
	Pr-i	H	MeO	CH ₂ SMe	MeS	H
40	Pr-i	H	MeO	CH ₂ SMe	MeSO	H
	Pr-i	H	MeO	CH ₂ SEt	Ms	H
	Pr-i	H	MeO	CH ₂ SEt	Cl	H
	Pr-i	H	MeO	CH ₂ SEt	MeS	H
	Pr-i	H	MeO	CH ₂ SEt	MeSO	H
45	Pr-i	H	MeO	CH ₂ SOMe	Ms	H
	Pr-i	H	MeO	CH ₂ SOEt	Ms	H
	Pr-i	H	MeO	CH ₂ SO ₂ Me	Ms	H
	Pr-i	H	MeO	CH ₂ SO ₂ Me	Cl	H
50						
55						

	A	B	X	Y	Z	Q
5	Pr-i	H	MeO	CH ₂ SO ₂ Me	MeS	H
	Pr-i	H	MeO	CH ₂ SO ₂ Me	MeSO	H
	Pr-i	H	MeO	CH ₂ SO ₂ Et	Ms	H
	Pr-i	H	MeO	CH ₂ SO ₂ Et	Cl	H
	Pr-i	H	MeO	CH ₂ SO ₂ Et	MeS	H
10	Pr-i	H	MeO	CH ₂ SO ₂ Et	MeSO	H
	Pr-i	H	MeO	CHMeSMe	Ms	H
	Pr-i	H	MeO	CHMeSEt	Ms	H
	Pr-i	H	MeO	CHMeSO ₂ Me	Ms	H
	Pr-i	H	MeO	CHMeSO ₂ Et	Ms	H
15	Pr-i	H	MeO	CH ₂ SCH ₂ CH ₂ OMe	Ms	H
	Pr-i	H	MeO	CH ₂ OCOMe	Ms	H
	Pr-i	H	MeO	CH ₂ OCOEt	Ms	H
	Pr-i	H	MeO	CHMeOCOMe	Ms	H
20	Pr-i	H	MeO	CH ₂ OSO ₂ Me	Ms	H
	Pr-i	H	MeO	CH ₂ OSO ₂ Et	Ms	H
	Pr-i	H	MeO	CHMeOSO ₂ Me	Ms	H

25

30

35

40

45

50

55

	A	B	X	Y	Z	Q
5	Me	Me	Me	CH ₂ OH	Ms	H
	Me	Me	Me	CH ₂ OMe	Ms	H
	Me	Me	Me	CH ₂ OMe	Cl	H
	Me	Me	Me	CH ₂ OMe	MeS	H
10	Me	Me	Me	CH ₂ OMe	MeSO	H
	Me	Me	Me	CH ₂ OMe	Ms	Q1
	Me	Me	Me	CH ₂ OMe	Cl	Q1
	Me	Me	Me	CH ₂ OMe	MeS	Q1
15	Me	Me	Me	CH ₂ OMe	MeSO	Q2
	Me	Me	Me	CH ₂ OMe	MeS	Q2
	Me	Me	Me	CH ₂ OMe	MeSO	Q2
	Me	Me	Me	CH ₂ OMe	Ms	Q3
	Me	Me	Me	CH ₂ OMe	MeS	Q3
20	Me	Me	Me	CH ₂ OMe	MeSO	Q3
	Me	Me	Me	CH ₂ OEt	Ms	H
	Me	Me	Me	CH ₂ OEt	Cl	H
	Me	Me	Me	CH ₂ OEt	MeS	H
25	Me	Me	Me	CH ₂ OEt	MeSO	H
	Me	Me	Me	CH ₂ OEt	Ms	Q1
	Me	Me	Me	CH ₂ OEt	MeS	Q1
	Me	Me	Me	CH ₂ OEt	MeSO	Q1
	Me	Me	Me	CH ₂ OEt	Ms	Q2
30	Me	Me	Me	CH ₂ OEt	MeS	Q2
	Me	Me	Me	CH ₂ OEt	MeSO	Q2
	Me	Me	Me	CH ₂ OEt	Ms	Q3
	Me	Me	Me	CH ₂ OEt	MeS	Q3
	Me	Me	Me	CH ₂ OEt	MeSO	Q3
35	Me	Me	Me	CH ₂ OPr-i	Ms	H
	Me	Me	Me	CH ₂ OPr-i	Cl	H
	Me	Me	Me	CH ₂ OPr-i	MeS	H
	Me	Me	Me	CH ₂ OPr-i	MeSO	H
40	Me	Me	Me	CH ₂ OPr-i	Ms	Q1
	Me	Me	Me	CH ₂ OPr-i	Ms	Q2
	Me	Me	Me	CH ₂ OPr-i	Ms	Q3
	Me	Me	Me	CH ₂ OPr-n	Ms	H
	Me	Me	Me	CH ₂ OCH=CH ₂	Ms	H
45	Me	Me	Me	CH ₂ OCH ₂ CH=CH ₂	Ms	H
	Me	Me	Me	CH ₂ OCH ₂ C≡CH	Ms	H
	Me	Me	Me	CH ₂ OCH ₂ CH ₂ Cl	Ms	H
	Me	Me	Me	CH ₂ O-Y5	Ms	H
50						
55						

	A	B	X	Y	Z	Q
5	Me	Me	Me	CHMeOH	Ms	H
	Me	Me	Me	CHMeOMe	Ms	H
	Me	Me	Me	CHMeOMe	Cl	H
	Me	Me	Me	CHMeOMe	MeS	H
10	Me	Me	Me	CHMeOMe	MeSO	H
	Me	Me	Me	CHMeOMe	Ms	Q1
	Me	Me	Me	CHMeOMe	Ms	Q2
	Me	Me	Me	CHMeOMe	Ms	Q3
15	Me	Me	Me	CHMeOEt	Ms	H
	Me	Me	Me	CHMeOEt	Cl	H
	Me	Me	Me	CHMeOEt	MeS	H
	Me	Me	Me	CHMeOEt	MeSO	H
	Me	Me	Me	CHMeOEt	Ms	Q1
20	Me	Me	Me	CHMeOEt	Ms	Q2
	Me	Me	Me	CHMeOEt	Ms	Q3
	Me	Me	Me	CHMeOPr-i	Ms	H
	Me	Me	Me	CHMeOPr-i	Cl	H
25	Me	Me	Me	CHMeOPr-i	MeS	H
	Me	Me	Me	CHMeOPr-i	MeSO	H
	Me	Me	Me	CHMeOPr-n	Ms	H
	Me	Me	Me	CHMeOCH=CH ₂	Ms	H
	Me	Me	Me	CHMeOCH=CH ₂	Ms	H
30	Me	Me	Me	CHMeOCH ₂ CH=CH ₂	Ms	H
	Me	Me	Me	CHMeOCH ₂ C≡CH	Ms	H
	Me	Me	Me	CHMeOCH ₂ CH ₂ Cl	Ms	H
	Me	Me	Me	CHMeO-Y5	Ms	H
35	Me	Me	Me	CMe ₂ OH	Ms	H
	Me	Me	Me	CMe ₂ OMe	Ms	H
	Me	Me	Me	CMe ₂ OEt	Ms	H
	Me	Me	Me	CMe ₂ OPr-i	Ms	H
	Me	Me	Me	CH ₂ CH ₂ OMe	Ms	H
40	Me	Me	Me	CH ₂ CH ₂ OEt	Ms	H
	Me	Me	Me	CH ₂ CH ₂ OPr-i	Ms	H
	Me	Me	Me	CH ₂ CH ₂ OH	Ms	H
	Me	Me	Me	CH ₂ CH ₂ OMe	Ms	H
	Me	Me	Me	CH ₂ CH ₂ OMe	Cl	H
45	Me	Me	Me	CH ₂ CH ₂ OMe	MeS	H
	Me	Me	Me	CH ₂ CH ₂ OMe	MeSO	H
	Me	Me	Me	CH ₂ CH ₂ OEt	Ms	H
	Me	Me	Me	CH ₂ CH ₂ OPr-i	Ms	H

50

55

	A	B	X	Y	Z	Q
5	Me	Me	Me	CH ₂ OCH ₂ CH ₂ OMe	Ms	H
	Me	Me	Me	CH ₂ OCH ₂ CH ₂ OMe	Cl	H
	Me	Me	Me	CH ₂ OCH ₂ CH ₂ OMe	MeS	H
	Me	Me	Me	CH ₂ OCH ₂ CH ₂ OMe	MeSO	H
10	Me	Me	Me	CH ₂ OCH ₂ CH ₂ OEt	Ms	H
	Me	Me	Me	CHMeOCH ₂ CH ₂ OMe	Ms	H
	Me	Me	Me	CH ₂ O-Y8	Ms	H
	Me	Me	Me	CH ₂ O-Y9	Ms	H
	Me	Me	Me	CH ₂ O-Y10	Ms	H
15	Me	Me	Me	CHMeO-Y8	Ms	H
	Me	Me	Me	CHMeO-Y9	Ms	H
	Me	Me	Me	CHMeO-Y10	Ms	H
	Me	Me	Me	CH ₂ O-Y13	Ms	H
20	Me	Me	Me	CHMeO-Y13	Ms	H
	Me	Me	Me	CH ₂ NMe ₂	Ms	H
	Me	Me	Me	CH ₂ -Y14	Ms	H
	Me	Me	Me	CHMeNMe ₂	Ms	H
	Me	Me	Me	CH ₂ CH ₂ NMe ₂	Ms	H
25	Me	Me	Me	CH ₂ OCH ₂ Ph	Ms	H
	Me	Me	Me	CHMeOCH ₂ Ph	Ms	H
	Me	Me	Me	CH ₂ OCH ₂ CO ₂ Me	Ms	H
	Me	Me	Me	CH ₂ OCH ₂ CO ₂ Et	Ms	H
30	Me	Me	Me	CH ₂ OCHMeCO ₂ Me	Ms	H
	Me	Me	Me	CH ₂ CN	Ms	H
	Me	Me	Me	CHMeCN	Ms	H
	Me	Me	Me	CH ₂ SMe	Ms	H
	Me	Me	Me	CH ₂ SMe	Cl	H
35	Me	Me	Me	CH ₂ SMe	MeS	H
	Me	Me	Me	CH ₂ SMe	MeSO	H
	Me	Me	Me	CH ₂ SEt	Ms	H
	Me	Me	Me	CH ₂ SEt	Cl	H
	Me	Me	Me	CH ₂ SEt	MeS	H
40	Me	Me	Me	CH ₂ SEt	MeSO	H
	Me	Me	Me	CH ₂ SOMe	Ms	H
	Me	Me	Me	CH ₂ SOEt	Ms	H
	Me	Me	Me	CH ₂ SO ₂ Me	Ms	H
45	Me	Me	Me	CH ₂ SO ₂ Me	Cl	H
	Me	Me	Me	CH ₂ SO ₂ Me	MeS	H
	Me	Me	Me	CH ₂ SO ₂ Me	MeSO	H
	Me	Me	Me	CH ₂ SO ₂ Et	Ms	H
50						
55						

	A	B	X	Y	Z	Q
5	Me	Me	Me	CH ₂ SO ₂ Et	Cl	H
	Me	Me	Me	CH ₂ SO ₂ Et	MeS	H
	Me	Me	Me	CH ₂ SO ₂ Et	MeSO	H
	Me	Me	Me	CHMeSMe	Ms	H
10	Me	Me	Me	CHMeSEt	Ms	H
	Me	Me	Me	CHMeSO ₂ Me	Ms	H
	Me	Me	Me	CHMeSO ₂ Et	Ms	H
	Me	Me	Me	CH ₂ SCH ₂ CH ₂ OMe	Ms	H
15	Me	Me	Me	CH ₂ OCOMe	Ms	H
	Me	Me	Me	CH ₂ OCOEt	Ms	H
	Me	Me	Me	CHMeOCOMe	Ms	H
	Me	Me	Me	CH ₂ OSO ₂ Me	Ms	H
	Me	Me	Me	CH ₂ OSO ₂ Et	Ms	H
20	Me	Me	Me	CHMeOSO ₂ Me	Ms	H
	Et	Me	Me	CH ₂ OH	Ms	H
	Et	Me	Me	CH ₂ OMe	Ms	H
	Et	Me	Me	CH ₂ OMe	Cl	H
	Et	Me	Me	CH ₂ OMe	MeS	H
25	Et	Me	Me	CH ₂ OMe	MeSO	H
	Et	Me	Me	CH ₂ OMe	Ms	Q1
	Et	Me	Me	CH ₂ OMe	Cl	Q1
	Et	Me	Me	CH ₂ OMe	MeS	Q1
30	Et	Me	Me	CH ₂ OMe	MeSO	Q2
	Et	Me	Me	CH ₂ OMe	MeS	Q2
	Et	Me	Me	CH ₂ OMe	MeSO	Q2
	Et	Me	Me	CH ₂ OMe	Ms	Q3
	Et	Me	Me	CH ₂ OMe	MeS	Q3
35	Et	Me	Me	CH ₂ OMe	MeSO	Q3
	Et	Me	Me	CH ₂ OEt	Ms	H
	Et	Me	Me	CH ₂ OEt	Cl	H
	Et	Me	Me	CH ₂ OEt	MeS	H
	Et	Me	Me	CH ₂ OEt	MeSO	H
40	Et	Me	Me	CH ₂ OEt	Ms	Q1
	Et	Me	Me	CH ₂ OEt	MeS	Q1
	Et	Me	Me	CH ₂ OEt	MeSO	Q1
	Et	Me	Me	CH ₂ OEt	Ms	Q2
45	Et	Me	Me	CH ₂ OEt	MeS	Q2
	Et	Me	Me	CH ₂ OEt	MeSO	Q2
	Et	Me	Me	CH ₂ OEt	Ms	Q3
	Et	Me	Me	CH ₂ OEt	MeS	Q3

50

55

	A	B	X	Y	Z	Q
5	Et	Me	Me	CH ₂ OEt	MeSO	Q3
	Et	Me	Me	CH ₂ OPr-i	Ms	H
	Et	Me	Me	CH ₂ OPr-i	Cl	H
	Et	Me	Me	CH ₂ OPr-i	MeS	H
10	Et	Me	Me	CH ₂ OPr-i	MeSO	H
	Et	Me	Me	CH ₂ OPr-i	Ms	Q1
	Et	Me	Me	CH ₂ OPr-i	Ms	Q2
	Et	Me	Me	CH ₂ OPr-i	Ms	Q3
15	Et	Me	Me	CH ₂ OPr-n	Ms	H
	Et	Me	Me	CH ₂ OCH=CH ₂	Ms	H
	Et	Me	Me	CH ₂ OCH ₂ CH=CH ₂	Ms	H
	Et	Me	Me	CH ₂ OCH ₂ C≡CH	Ms	H
	Et	Me	Me	CH ₂ OCH ₂ CH ₂ Cl	Ms	H
20	Et	Me	Me	CH ₂ O-Y5	Ms	H
	Et	Me	Me	CHMeOH	Ms	H
	Et	Me	Me	CHMeOMe	Ms	H
	Et	Me	Me	CHMeOMe	Cl	H
	Et	Me	Me	CHMeOMe	MeS	H
25	Et	Me	Me	CHMeOMe	MeSO	H
	Et	Me	Me	CHMeOMe	Ms	Q1
	Et	Me	Me	CHMeOMe	Ms	Q2
	Et	Me	Me	CHMeOMe	Ms	Q3
30	Et	Me	Me	CHMeOEt	Ms	H
	Et	Me	Me	CHMeOEt	Cl	H
	Et	Me	Me	CHMeOEt	MeS	H
	Et	Me	Me	CHMeOEt	MeSO	H
	Et	Me	Me	CHMeOEt	Ms	Q1
35	Et	Me	Me	CHMeOEt	Ms	Q2
	Et	Me	Me	CHMeOEt	Ms	Q3
	Et	Me	Me	CHMeOPr-i	Ms	H
	Et	Me	Me	CHMeOPr-i	Cl	H
40	Et	Me	Me	CHMeOPr-i	MeS	H
	Et	Me	Me	CHMeOPr-i	MeSO	H
	Et	Me	Me	CHMeOPr-n	Ms	H
	Et	Me	Me	CHMeOCH=CH ₂	Ms	H
	Et	Me	Me	CHMeOCH=CH ₂	Ms	H
45	Et	Me	Me	CHMeOCH ₂ CH=CH ₂	Ms	H
	Et	Me	Me	CHMeOCH ₂ C≡CH	Ms	H
	Et	Me	Me	CHMeOCH ₂ CH ₂ Cl	Ms	H
	Et	Me	Me	CHMeO-Y5	Ms	H

50

55

	A	B	X	Y	Z	Q
5	Et	Me	Me	CMe ₂ OH	Ms	H
	Et	Me	Me	CMe ₂ OMe	Ms	H
	Et	Me	Me	CMe ₂ OEt	Ms	H
	Et	Me	Me	CMe ₂ OPr-i	Ms	H
10	Et	Me	Me	CH ₂ CH ₂ OMe	Ms	H
	Et	Me	Me	CH ₂ CH ₂ OEt	Ms	H
	Et	Me	Me	CH ₂ CH ₂ OPr-i	Ms	H
	Et	Me	Me	CHEtOH	Ms	H
15	Et	Me	Me	CHEtOMe	Ms	H
	Et	Me	Me	CHEtOMe	Cl	H
	Et	Me	Me	CHEtOMe	MeS	H
	Et	Me	Me	CHEtOMe	MeSO	H
	Et	Me	Me	CHEtOEt	Ms	H
20	Et	Me	Me	CHEtOPr-i	Ms	H
	Et	Me	Me	CH ₂ OCH ₂ CH ₂ OMe	Ms	H
	Et	Me	Me	CH ₂ OCH ₂ CH ₂ OMe	Cl	H
	Et	Me	Me	CH ₂ OCH ₂ CH ₂ OMe	MeS	H
25	Et	Me	Me	CH ₂ OCH ₂ CH ₂ OMe	MeSO	H
	Et	Me	Me	CH ₂ OCH ₂ CH ₂ OEt	Ms	H
	Et	Me	Me	CHMeOCH ₂ CH ₂ OMe	Ms	H
	Et	Me	Me	CH ₂ O-Y8	Ms	H
	Et	Me	Me	CH ₂ O-Y9	Ms	H
30	Et	Me	Me	CH ₂ O-Y10	Ms	H
	Et	Me	Me	CHMeO-Y8	Ms	H
	Et	Me	Me	CHMeO-Y9	Ms	H
	Et	Me	Me	CHMeO-Y10	Ms	H
	Et	Me	Me	CH ₂ O-Y13	Ms	H
35	Et	Me	Me	CHMeO-Y13	Ms	H
	Et	Me	Me	CH ₂ NMe ₂	Ms	H
	Et	Me	Me	CH ₂ -Y14	Ms	H
	Et	Me	Me	CHMeNMe ₂	Ms	H
40	Et	Me	Me	CH ₂ CH ₂ NMe ₂	Ms	H
	Et	Me	Me	CH ₂ OCH ₂ Ph	Ms	H
	Et	Me	Me	CHMeOCH ₂ Ph	Ms	H
	Et	Me	Me	CH ₂ OCH ₂ CO ₂ Me	Ms	H
	Et	Me	Me	CH ₂ OCH ₂ CO ₂ Et	Ms	H
45	Et	Me	Me	CH ₂ OCHMeCO ₂ Me	Ms	H
	Et	Me	Me	CH ₂ CN	Ms	H
	Et	Me	Me	CHMeCN	Ms	H
	Et	Me	Me	CH ₂ SMe	Ms	H

50

55

	A	B	X	Y	Z	Q
5	Et	Me	Me	CH ₂ SMe	Cl	H
	Et	Me	Me	CH ₂ SMe	MeS	H
	Et	Me	Me	CH ₂ SMe	MeSO	H
10	Et	Me	Me	CH ₂ SEt	Ms	H
	Et	Me	Me	CH ₂ SEt	Cl	H
	Et	Me	Me	CH ₂ SEt	MeS	H
	Et	Me	Me	CH ₂ SEt	MeSO	H
	Et	Me	Me	CH ₂ SOMe	Ms	H
15	Et	Me	Me	CH ₂ SOEt	Ms	H
	Et	Me	Me	CH ₂ SO ₂ Me	Ms	H
	Et	Me	Me	CH ₂ SO ₂ Me	Cl	H
	Et	Me	Me	CH ₂ SO ₂ Me	MeS	H
	Et	Me	Me	CH ₂ SO ₂ Me	MeSO	H
20	Et	Me	Me	CH ₂ SO ₂ Et	Ms	H
	Et	Me	Me	CH ₂ SO ₂ Et	Cl	H
	Et	Me	Me	CH ₂ SO ₂ Et	MeS	H
	Et	Me	Me	CH ₂ SO ₂ Et	MeSO	H
25	Et	Me	Me	CHMeSMe	Ms	H
	Et	Me	Me	CHMeSEt	Ms	H
	Et	Me	Me	CHMeSO ₂ Me	Ms	H
	Et	Me	Me	CHMeSO ₂ Et	Ms	H
	Et	Me	Me	CH ₂ SCH ₂ CH ₂ OMe	Ms	H
30	Et	Me	Me	CH ₂ OCOMe	Ms	H
	Et	Me	Me	CH ₂ OCOEt	Ms	H
	Et	Me	Me	CHMeOCOMe	Ms	H
	Et	Me	Me	CH ₂ OSO ₂ Me	Ms	H
	Et	Me	Me	CH ₂ OSO ₂ Et	Ms	H
35	Et	Me	Me	CHMeOSO ₂ Me	Ms	H
	Pr-i	Me	Me	CH ₂ OH	Ms	H
	Pr-i	Me	Me	CH ₂ OMe	Ms	H
	Pr-i	Me	Me	CH ₂ OMe	Cl	H
40	Pr-i	Me	Me	CH ₂ OMe	MeS	H
	Pr-i	Me	Me	CH ₂ OMe	MeSO	H
	Pr-i	Me	Me	CH ₂ OMe	Ms	Q1
	Pr-i	Me	Me	CH ₂ OMe	Cl	Q1
	Pr-i	Me	Me	CH ₂ OMe	MeS	Q1
45	Pr-i	Me	Me	CH ₂ OMe	MeSO	Q2
	Pr-i	Me	Me	CH ₂ OMe	MeS	Q2
	Pr-i	Me	Me	CH ₂ OMe	MeSO	Q2
	Pr-i	Me	Me	CH ₂ OMe	Ms	Q3
50						
55						

	A	B	X	Y	Z	Q
5	Pr-i	Me	Me	CH ₂ OMe	MeS	Q3
	Pr-i	Me	Me	CH ₂ OMe	MeSO	Q3
	Pr-i	Me	Me	CH ₂ OE t	Ms	H
	Pr-i	Me	Me	CH ₂ OE t	Cl	H
10	Pr-i	Me	Me	CH ₂ OE t	MeS	H
	Pr-i	Me	Me	CH ₂ OE t	MeSO	H
	Pr-i	Me	Me	CH ₂ OE t	Ms	Q1
	Pr-i	Me	Me	CH ₂ OE t	MeS	Q1
15	Pr-i	Me	Me	CH ₂ OE t	MeSO	Q1
	Pr-i	Me	Me	CH ₂ OE t	Ms	Q2
	Pr-i	Me	Me	CH ₂ OE t	MeS	Q2
	Pr-i	Me	Me	CH ₂ OE t	MeSO	Q2
	Pr-i	Me	Me	CH ₂ OE t	Ms	Q3
20	Pr-i	Me	Me	CH ₂ OE t	MeS	Q3
	Pr-i	Me	Me	CH ₂ OE t	MeSO	Q3
	Pr-i	Me	Me	CH ₂ OPr-i	Ms	H
	Pr-i	Me	Me	CH ₂ OPr-i	Cl	H
	Pr-i	Me	Me	CH ₂ OPr-i	MeS	H
25	Pr-i	Me	Me	CH ₂ OPr-i	MeSO	H
	Pr-i	Me	Me	CH ₂ OPr-i	Ms	Q1
	Pr-i	Me	Me	CH ₂ OPr-i	Ms	Q2
	Pr-i	Me	Me	CH ₂ OPr-i	Ms	Q3
30	Pr-i	Me	Me	CH ₂ OPr-a	Ms	H
	Pr-i	Me	Me	CH ₂ OCH =CH ₂	Ms	H
	Pr-i	Me	Me	CH ₂ OCH ₂ CH=CH ₂	Ms	H
	Pr-i	Me	Me	CH ₂ OCH ₂ C ≡CH	Ms	H
	Pr-i	Me	Me	CH ₂ OCH ₂ CH ₂ Cl	Ms	H
35	Pr-i	Me	Me	CH ₂ O-Y5	Ms	H
	Pr-i	Me	Me	CHMeOH	Ms	H
	Pr-i	Me	Me	CHMeOMe	Ms	H
	Pr-i	Me	Me	CHMeOMe	Cl	H
	Pr-i	Me	Me	CHMeOMe	MeS	H
40	Pr-i	Me	Me	CHMeOMe	MeSO	H
	Pr-i	Me	Me	CHMeOMe	Ms	Q1
	Pr-i	Me	Me	CHMeOMe	Ms	Q2
	Pr-i	Me	Me	CHMeOMe	Ms	Q3
45	Pr-i	Me	Me	CHMeOE t	Ms	H
	Pr-i	Me	Me	CHMeOE t	Cl	H
	Pr-i	Me	Me	CHMeOE t	MeS	H
	Pr-i	Me	Me	CHMeOE t	MeSO	H

50

55

	A	B	X	Y	Z	Q
5	Pr-i	Me	Me	CHMeOE t	Ms	Q1
	Pr-i	Me	Me	CHMeOE t	Ms	Q2
	Pr-i	Me	Me	CHMeOE t	Ms	Q3
	Pr-i	Me	Me	CHMeOPr-i	Ms	H
10	Pr-i	Me	Me	CHMeOPr-i	Cl	H
	Pr-i	Me	Me	CHMeOPr-i	MeS	H
	Pr-i	Me	Me	CHMeOPr-i	MeSO	H
	Pr-i	Me	Me	CHMeOPr-i	Ms	H
15	Pr-i	Me	Me	CHMeOCH=CH ₂	Ms	H
	Pr-i	Me	Me	CHMeOCH=CH ₂	Ms	H
	Pr-i	Me	Me	CHMeOCH ₂ CH=CH ₂	Ms	H
	Pr-i	Me	Me	CHMeOCH ₂ C≡CH	Ms	H
	Pr-i	Me	Me	CHMeOCH ₂ CH ₂ Cl	Ms	H
20	Pr-i	Me	Me	CHMeO-Y5	Ms	H
	Pr-i	Me	Me	CMe ₂ OH	Ms	H
	Pr-i	Me	Me	CMe ₂ OMe	Ms	H
	Pr-i	Me	Me	CMe ₂ OE t	Ms	H
25	Pr-i	Me	Me	CMe ₂ OPr-i	Ms	H
	Pr-i	Me	Me	CH ₂ CH ₂ OMe	Ms	H
	Pr-i	Me	Me	CH ₂ CH ₂ OE t	Ms	H
	Pr-i	Me	Me	CH ₂ CH ₂ OPr-i	Ms	H
	Pr-i	Me	Me	CHEtOH	Ms	H
30	Pr-i	Me	Me	CHEtOMe	Ms	H
	Pr-i	Me	Me	CHEtOMe	Cl	H
	Pr-i	Me	Me	CHEtOMe	MeS	H
	Pr-i	Me	Me	CHEtOMe	MeSO	H
	Pr-i	Me	Me	CHEtOE t	Ms	H
35	Pr-i	Me	Me	CHEtOPr-i	Ms	H
	Pr-i	Me	Me	CH ₂ OCH ₂ CH ₂ OMe	Ms	H
	Pr-i	Me	Me	CH ₂ OCH ₂ CH ₂ OMe	Cl	H
	Pr-i	Me	Me	CH ₂ OCH ₂ CH ₂ OMe	MeS	H
40	Pr-i	Me	Me	CH ₂ OCH ₂ CH ₂ OMe	MeSO	H
	Pr-i	Me	Me	CH ₂ OCH ₂ CH ₂ OE t	Ms	H
	Pr-i	Me	Me	CHMeOCH ₂ CH ₂ OMe	Ms	H
	Pr-i	Me	Me	CH ₂ O-Y8	Ms	H
	Pr-i	Me	Me	CH ₂ O-Y9	Ms	H
45	Pr-i	Me	Me	CH ₂ O-Y10	Ms	H
	Pr-i	Me	Me	CHMeO-Y8	Ms	H
	Pr-i	Me	Me	CHMeO-Y9	Ms	H
	Pr-i	Me	Me	CHMeO-Y10	Ms	H
50						
55						

	A	B	X	Y	Z	Q
5	Pr-i	Me	Me	CH ₂ O-Y13	Ms	H
	Pr-i	Me	Me	CHMeO-Y13	Ms	H
	Pr-i	Me	Me	CH ₂ NMe ₂	Ms	H
	Pr-i	Me	Me	CH ₂ -Y14	Ms	H
10	Pr-i	Me	Me	CHMeNMe ₂	Ms	H
	Pr-i	Me	Me	CH ₂ CH ₂ NMe ₂	Ms	H
	Pr-i	Me	Me	CH ₂ OCH ₂ Ph	Ms	H
	Pr-i	Me	Me	CHMeOCH ₂ Ph	Ms	H
15	Pr-i	Me	Me	CH ₂ OCH ₂ CO ₂ Me	Ms	H
	Pr-i	Me	Me	CH ₂ OCH ₂ CO ₂ Et	Ms	H
	Pr-i	Me	Me	CH ₂ OCHMeCO ₂ Me	Ms	H
	Pr-i	Me	Me	CH ₂ CN	Ms	H
	Pr-i	Me	Me	CHMeCN	Ms	H
20	Pr-i	Me	Me	CH ₂ SMe	Ms	H
	Pr-i	Me	Me	CH ₂ SMe	Cl	H
	Pr-i	Me	Me	CH ₂ SMe	MeS	H
	Pr-i	Me	Me	CH ₂ SMe	MeSO	H
	Pr-i	Me	Me	CH ₂ SEt	Ms	H
25	Pr-i	Me	Me	CH ₂ SEt	Cl	H
	Pr-i	Me	Me	CH ₂ SEt	MeS	H
	Pr-i	Me	Me	CH ₂ SEt	MeSO	H
	Pr-i	Me	Me	CH ₂ SOMe	Ms	H
30	Pr-i	Me	Me	CH ₂ SOEt	Ms	H
	Pr-i	Me	Me	CH ₂ SO ₂ Me	Ms	H
	Pr-i	Me	Me	CH ₂ SO ₂ Me	Cl	H
	Pr-i	Me	Me	CH ₂ SO ₂ Me	MeS	H
	Pr-i	Me	Me	CH ₂ SO ₂ Me	MeSO	H
35	Pr-i	Me	Me	CH ₂ SO ₂ Et	Ms	H
	Pr-i	Me	Me	CH ₂ SO ₂ Et	Cl	H
	Pr-i	Me	Me	CH ₂ SO ₂ Et	MeS	H
	Pr-i	Me	Me	CH ₂ SO ₂ Et	MeSO	H
	Pr-i	Me	Me	CHMeSMe	Ms	H
40	Pr-i	Me	Me	CHMeSEt	Ms	H
	Pr-i	Me	Me	CHMeSO ₂ Me	Ms	H
	Pr-i	Me	Me	CHMeSO ₂ Et	Ms	H
	Pr-i	Me	Me	CH ₂ SCH ₂ CH ₂ OMe	Ms	H
45	Pr-i	Me	Me	CH ₂ OCOMe	Ms	H
	Pr-i	Me	Me	CH ₂ OCOEt	Ms	H
	Pr-i	Me	Me	CHMeOCOMe	Ms	H
	Pr-i	Me	Me	CH ₂ OSO ₂ Me	Ms	H
	Pr-i	Me	Me	CH ₂ OSO ₂ Et	Ms	H
50	Pr-i	Me	Me	CHMeOSO ₂ Me	Ms	H

	A	B	X	Y	Z	Q
5	Me	Me	Cl	CH ₂ OH	Ms	H
	Me	Me	Cl	CH ₂ OMe	Ms	H
	Me	Me	Cl	CH ₂ OMe	Cl	H
	Me	Me	Cl	CH ₂ OMe	MeS	H
10	Me	Me	Cl	CH ₂ OMe	MeSO	H
	Me	Me	Cl	CH ₂ OMe	Ms	Q1
	Me	Me	Cl	CH ₂ OMe	Cl	Q1
	Me	Me	Cl	CH ₂ OMe	MeS	Q1
15	Me	Me	Cl	CH ₂ OMe	MeSO	Q2
	Me	Me	Cl	CH ₂ OMe	MeS	Q2
	Me	Me	Cl	CH ₂ OMe	MeSO	Q2
	Me	Me	Cl	CH ₂ OMe	Ms	Q3
	Me	Me	Cl	CH ₂ OMe	MeS	Q3
20	Me	Me	Cl	CH ₂ OMe	MeSO	Q3
	Me	Me	Cl	CH ₂ OEt	Ms	H
	Me	Me	Cl	CH ₂ OEt	Cl	H
	Me	Me	Cl	CH ₂ OEt	MeS	H
25	Me	Me	Cl	CH ₂ OEt	MeSO	H
	Me	Me	Cl	CH ₂ OEt	Ms	Q1
	Me	Me	Cl	CH ₂ OEt	MeS	Q1
	Me	Me	Cl	CH ₂ OEt	MeSO	Q1
	Me	Me	Cl	CH ₂ OEt	Ms	Q2
30	Me	Me	Cl	CH ₂ OEt	MeS	Q2
	Me	Me	Cl	CH ₂ OEt	MeSO	Q2
	Me	Me	Cl	CH ₂ OEt	Ms	Q3
	Me	Me	Cl	CH ₂ OEt	MeS	Q3
35	Me	Me	Cl	CH ₂ OEt	MeSO	Q3
	Me	Me	Cl	CH ₂ OPr-i	Ms	H
	Me	Me	Cl	CH ₂ OPr-i	Cl	H
	Me	Me	Cl	CH ₂ OPr-i	MeS	H
	Me	Me	Cl	CH ₂ OPr-i	MeSO	H
40	Me	Me	Cl	CH ₂ OPr-i	Ms	Q1
	Me	Me	Cl	CH ₂ OPr-i	Ms	Q2
	Me	Me	Cl	CH ₂ OPr-i	Ms	Q3
	Me	Me	Cl	CH ₂ OPr-n	Ms	H
	Me	Me	Cl	CH ₂ OCH=CH ₂	Ms	H
45	Me	Me	Cl	CH ₂ OCH ₂ CH=CH ₂	Ms	H
	Me	Me	Cl	CH ₂ OCH ₂ C≡CH	Ms	H
	Me	Me	Cl	CH ₂ OCH ₂ CH ₂ Cl	Ms	H
	Me	Me	Cl	CH ₂ O-Y5	Ms	H
50						
55						

	A	B	X	Y	Z	Q
5	Me	Me	Cl	CHMeOH	Ms	H
	Me	Me	Cl	CHMeOMe	Ms	H
	Me	Me	Cl	CHMeOMe	Cl	H
	Me	Me	Cl	CHMeOMe	MeS	H
10	Me	Me	Cl	CHMeOMe	MeSO	H
	Me	Me	Cl	CHMeOMe	Ms	Q1
	Me	Me	Cl	CHMeOMe	Ms	Q2
	Me	Me	Cl	CHMeOMe	Ms	Q3
15	Me	Me	Cl	CHMeOEt	Ms	H
	Me	Me	Cl	CHMeOEt	Cl	H
	Me	Me	Cl	CHMeOEt	MeS	H
	Me	Me	Cl	CHMeOEt	MeSO	H
	Me	Me	Cl	CHMeOEt	Ms	Q1
20	Me	Me	Cl	CHMeOEt	Ms	Q2
	Me	Me	Cl	CHMeOEt	Ms	Q3
	Me	Me	Cl	CHMeOPr-i	Ms	H
	Me	Me	Cl	CHMeOPr-i	Cl	H
	Me	Me	Cl	CHMeOPr-i	MeS	H
25	Me	Me	Cl	CHMeOPr-i	MeSO	H
	Me	Me	Cl	CHMeOPr-n	Ms	H
	Me	Me	Cl	CHMeOCH=CH ₂	Ms	H
	Me	Me	Cl	CHMeOCH=CH ₂	Ms	H
30	Me	Me	Cl	CHMeOCH ₂ CH=CH ₂	Ms	H
	Me	Me	Cl	CHMeOCH ₂ C≡CH	Ms	H
	Me	Me	Cl	CHMeOCH ₂ CH ₂ Cl	Ms	H
	Me	Me	Cl	CHMeO-Y5	Ms	H
	Me	Me	Cl	CMe ₂ OH	Ms	H
35	Me	Me	Cl	CMe ₂ OMe	Ms	H
	Me	Me	Cl	CMe ₂ OEt	Ms	H
	Me	Me	Cl	CMe ₂ OPr-i	Ms	H
	Me	Me	Cl	CH ₂ CH ₂ OMe	Ms	H
	Me	Me	Cl	CH ₂ CH ₂ OEt	Ms	H
40	Me	Me	Cl	CH ₂ CH ₂ OPr-i	Ms	H
	Me	Me	Cl	CHEtOH	Ms	H
	Me	Me	Cl	CHEtOMe	Ms	H
	Me	Me	Cl	CHEtOMe	Cl	H
45	Me	Me	Cl	CHEtOMe	MeS	H
	Me	Me	Cl	CHEtOMe	MeSO	H
	Me	Me	Cl	CHEtOEt	Ms	H
	Me	Me	Cl	CHEtOPr-i	Ms	H

50

55

	A	B	X	Y	Z	Q
5	Me	Me	Cl	CH ₂ OCH ₂ CH ₂ OMe	Ms	H
	Me	Me	Cl	CH ₂ OCH ₂ CH ₂ OMe	Cl	H
	Me	Me	Cl	CH ₂ OCH ₂ CH ₂ OMe	MeS	H
	Me	Me	Cl	CH ₂ OCH ₂ CH ₂ OMe	MeSO	H
10	Me	Me	Cl	CH ₂ OCH ₂ CH ₂ OEt	Ms	H
	Me	Me	Cl	CHMeOCH ₂ CH ₂ OMe	Ms	H
	Me	Me	Cl	CH ₂ O-Y8	Ms	H
	Me	Me	Cl	CH ₂ O-Y9	Ms	H
15	Me	Me	Cl	CH ₂ O-Y10	Ms	H
	Me	Me	Cl	CHMeO-Y8	Ms	H
	Me	Me	Cl	CHMeO-Y9	Ms	H
	Me	Me	Cl	CHMeO-Y10	Ms	H
	Me	Me	Cl	CH ₂ O-Y13	Ms	H
20	Me	Me	Cl	CHMeO-Y13	Ms	H
	Me	Me	Cl	CH ₂ NMe ₂	Ms	H
	Me	Me	Cl	CH ₂ -Y14	Ms	H
	Me	Me	Cl	CHMeNMe ₂	Ms	H
25	Me	Me	Cl	CH ₂ CH ₂ NMe ₂	Ms	H
	Me	Me	Cl	CH ₂ OCH ₂ Ph	Ms	H
	Me	Me	Cl	CHMeOCH ₂ Ph	Ms	H
	Me	Me	Cl	CH ₂ OCH ₂ CO ₂ Me	Ms	H
	Me	Me	Cl	CH ₂ OCH ₂ CO ₂ Et	Ms	H
30	Me	Me	Cl	CH ₂ OCHMeCO ₂ Me	Ms	H
	Me	Me	Cl	CH ₂ CN	Ms	H
	Me	Me	Cl	CHMeCN	Ms	H
	Me	Me	Cl	CH ₂ SMe	Ms	H
35	Me	Me	Cl	CH ₂ SMe	Cl	H
	Me	Me	Cl	CH ₂ SMe	MeS	H
	Me	Me	Cl	CH ₂ SMe	MeSO	H
	Me	Me	Cl	CH ₂ SEt	Ms	H
	Me	Me	Cl	CH ₂ SEt	Cl	H
40	Me	Me	Cl	CH ₂ SEt	MeS	H
	Me	Me	Cl	CH ₂ SEt	MeSO	H
	Me	Me	Cl	CH ₂ SOMe	Ms	H
	Me	Me	Cl	CH ₂ SOEt	Ms	H
	Me	Me	Cl	CH ₂ SO ₂ Me	Ms	H
45	Me	Me	Cl	CH ₂ SO ₂ Me	Cl	H
	Me	Me	Cl	CH ₂ SO ₂ Me	MeS	H
	Me	Me	Cl	CH ₂ SO ₂ Me	MeSO	H
	Me	Me	Cl	CH ₂ SO ₂ Et	Ms	H
50						
55						

	A	B	X	Y	Z	Q
5	Me	Me	Cl	CH ₂ SO ₂ Et	Cl	H
	Me	Me	Cl	CH ₂ SO ₂ Et	MeS	H
	Me	Me	Cl	CH ₂ SO ₂ Et	MeSO	H
	Me	Me	Cl	CHMeSMe	Ms	H
10	Me	Me	Cl	CHMeSEt	Ms	H
	Me	Me	Cl	CHMeSO ₂ Me	Ms	H
	Me	Me	Cl	CHMeSO ₂ Et	Ms	H
	Me	Me	Cl	CH ₂ SCH ₂ CH ₂ OMe	Ms	H
15	Me	Me	Cl	CH ₂ OCOMe	Ms	H
	Me	Me	Cl	CH ₂ OCOEt	Ms	H
	Me	Me	Cl	CHMeOCOMe	Ms	H
	Me	Me	Cl	CH ₂ OSO ₂ Me	Ms	H
	Me	Me	Cl	CH ₂ OSO ₂ Et	Ms	H
20	Me	Me	Cl	CHMeOSO ₂ Me	Ms	H
	Et	Me	Cl	CH ₂ OH	Ms	H
	Et	Me	Cl	CH ₂ OMe	Ms	H
	Et	Me	Cl	CH ₂ OMe	Cl	H
25	Et	Me	Cl	CH ₂ OMe	MeS	H
	Et	Me	Cl	CH ₂ OMe	MeSO	H
	Et	Me	Cl	CH ₂ OMe	Ms	Q1
	Et	Me	Cl	CH ₂ OMe	Cl	Q1
	Et	Me	Cl	CH ₂ OMe	MeS	Q1
30	Et	Me	Cl	CH ₂ OMe	MeSO	Q2
	Et	Me	Cl	CH ₂ OMe	MeS	Q2
	Et	Me	Cl	CH ₂ OMe	MeSO	Q2
	Et	Me	Cl	CH ₂ OMe	Ms	Q3
	Et	Me	Cl	CH ₂ OMe	MeS	Q3
35	Et	Me	Cl	CH ₂ OMe	MeSO	Q3
	Et	Me	Cl	CH ₂ OEt	Ms	H
	Et	Me	Cl	CH ₂ OEt	Cl	H
	Et	Me	Cl	CH ₂ OEt	MeS	H
40	Et	Me	Cl	CH ₂ OEt	MeSO	H
	Et	Me	Cl	CH ₂ OEt	Ms	Q1
	Et	Me	Cl	CH ₂ OEt	MeS	Q1
	Et	Me	Cl	CH ₂ OEt	MeSO	Q1
	Et	Me	Cl	CH ₂ OEt	Ms	Q2
45	Et	Me	Cl	CH ₂ OEt	MeS	Q2
	Et	Me	Cl	CH ₂ OEt	MeSO	Q2
	Et	Me	Cl	CH ₂ OEt	Ms	Q3
	Et	Me	Cl	CH ₂ OEt	MeS	Q3

50

55

	A	E	X	Y	Z	Q
5	Et	Me	Cl	CH ₂ OEt	MeSO	Q3
	Et	Me	Cl	CH ₂ OPr-i	Ms	H
	Et	Me	Cl	CH ₂ OPr-i	Cl	H
	Et	Me	Cl	CH ₂ OPr-i	MeS	H
10	Et	Me	Cl	CH ₂ OPr-i	MeSO	H
	Et	Me	Cl	CH ₂ OPr-i	Ms	Q1
	Et	Me	Cl	CH ₂ OPr-i	Ms	Q2
	Et	Me	Cl	CH ₂ OPr-i	Ms	Q3
15	Et	Me	Cl	CH ₂ OPr-n	Ms	H
	Et	Me	Cl	CH ₂ OCH=CH ₂	Ms	H
	Et	Me	Cl	CH ₂ OCH ₂ CH=CH ₂	Ms	H
	Et	Me	Cl	CH ₂ OCH ₂ C≡CH	Ms	H
	Et	Me	Cl	CH ₂ OCH ₂ CH ₂ Cl	Ms	H
20	Et	Me	Cl	CH ₂ O-Y5	Ms	H
	Et	Me	Cl	CHMeOH	Ms	H
	Et	Me	Cl	CHMeOMe	Ms	H
	Et	Me	Cl	CHMeOMe	Cl	H
25	Et	Me	Cl	CHMeOMe	MeS	H
	Et	Me	Cl	CHMeOMe	MeSO	H
	Et	Me	Cl	CHMeOMe	Ms	Q1
	Et	Me	Cl	CHMeOMe	Ms	Q2
	Et	Me	Cl	CHMeOMe	Ms	Q3
30	Et	Me	Cl	CHMeOEt	Ms	H
	Et	Me	Cl	CHMeOEt	Cl	H
	Et	Me	Cl	CHMeOEt	MeS	H
	Et	Me	Cl	CHMeOEt	MeSO	H
	Et	Me	Cl	CHMeOEt	Ms	Q1
35	Et	Me	Cl	CHMeOEt	Ms	Q2
	Et	Me	Cl	CHMeOEt	Ms	Q3
	Et	Me	Cl	CHMeOPr-i	Ms	H
	Et	Me	Cl	CHMeOPr-i	Cl	H
40	Et	Me	Cl	CHMeOPr-i	MeS	H
	Et	Me	Cl	CHMeOPr-i	MeSO	H
	Et	Me	Cl	CHMeOPr-n	Ms	H
	Et	Me	Cl	CHMeOCH=CH ₂	Ms	H
	Et	Me	Cl	CHMeOCH=CH ₂	Ms	H
45	Et	Me	Cl	CHMeOCH ₂ CH=CH ₂	Ms	H
	Et	Me	Cl	CHMeOCH ₂ C≡CH	Ms	H
	Et	Me	Cl	CHMeOCH ₂ CH ₂ Cl	Ms	H
	Et	Me	Cl	CHMeO-Y5	Ms	H

50

55

	A	B	X	Y	Z	Q
5	Et	Me	Cl	CMe ₂ OH	Ms	H
	Et	Me	Cl	CMe ₂ OMe	Ms	H
	Et	Me	Cl	CMe ₂ OEt	Ms	H
	Et	Me	Cl	CMe ₂ OPr-i	Ms	H
10	Et	Me	Cl	CH ₂ CH ₂ OMe	Ms	H
	Et	Me	Cl	CH ₂ CH ₂ OEt	Ms	H
	Et	Me	Cl	CH ₂ CH ₂ OPr-i	Ms	H
	Et	Me	Cl	CH ₂ OH	Ms	H
15	Et	Me	Cl	CH ₂ OMe	Ms	H
	Et	Me	Cl	CH ₂ OMe	Cl	H
	Et	Me	Cl	CH ₂ OMe	MeS	H
	Et	Me	Cl	CH ₂ OMe	MeSO	H
	Et	Me	Cl	CH ₂ OEt	Ms	H
20	Et	Me	Cl	CH ₂ OPr-i	Ms	H
	Et	Me	Cl	CH ₂ OCH ₂ CH ₂ OMe	Ms	H
	Et	Me	Cl	CH ₂ OCH ₂ CH ₂ OMe	Cl	H
	Et	Me	Cl	CH ₂ OCH ₂ CH ₂ OMe	MeS	H
25	Et	Me	Cl	CH ₂ OCH ₂ CH ₂ OMe	MeSO	H
	Et	Me	Cl	CH ₂ OCH ₂ CH ₂ OEt	Ms	H
	Et	Me	Cl	CHMeOCH ₂ CH ₂ OMe	Ms	H
	Et	Me	Cl	CH ₂ O-Y8	Ms	H
	Et	Me	Cl	CH ₂ O-Y9	Ms	H
30	Et	Me	Cl	CH ₂ O-Y10	Ms	H
	Et	Me	Cl	CHMeO-Y8	Ms	H
	Et	Me	Cl	CHMeO-Y9	Ms	H
	Et	Me	Cl	CHMeO-Y10	Ms	H
	Et	Me	Cl	CH ₂ O-Y13	Ms	H
35	Et	Me	Cl	CHMeO-Y13	Ms.	H
	Et	Me	Cl	CH ₂ NMe ₂	Ms	H
	Et	Me	Cl	CH ₂ -Y14	Ms	H
	Et	Me	Cl	CHMeNMe ₂	Ms	H
40	Et	Me	Cl	CH ₂ CH ₂ NMe ₂	Ms	H
	Et	Me	Cl	CH ₂ OCH ₂ Ph	Ms	H
	Et	Me	Cl	CHMeOCH ₂ Ph	Ms	H
	Et	Me	Cl	CH ₂ OCH ₂ CO ₂ Me	Ms	H
	Et	Me	Cl	CH ₂ OCH ₂ CO ₂ Et	Ms	H
45	Et	Me	Cl	CH ₂ OCHMeCO ₂ Me	Ms	H
	Et	Me	Cl	CH ₂ CN	Ms	H
	Et	Me	Cl	CHMeCN	Ms	H
	Et	Me	Cl	CH ₂ SMe	Ms	H

50

55

	A	B	X	Y	Z	Q
5	Et	Me	Cl	CH ₂ SMe	Cl	H
	Et	Me	Cl	CH ₂ SMe	MeS	H
	Et	Me	Cl	CH ₂ SMe	MeSO	H
	Et	Me	Cl	CH ₂ SEt	Ms	H
10	Et	Me	Cl	CH ₂ SEt	Cl	H
	Et	Me	Cl	CH ₂ SEt	MeS	H
	Et	Me	Cl	CH ₂ SEt	MeSO	H
	Et	Me	Cl	CH ₂ SOMe	Ms	H
15	Et	Me	Cl	CH ₂ SOEt	Ms	H
	Et	Me	Cl	CH ₂ SO ₂ Me	Ms	H
	Et	Me	Cl	CH ₂ SO ₂ Me	Cl	H
	Et	Me	Cl	CH ₂ SO ₂ Me	MeS	H
	Et	Me	Cl	CH ₂ SO ₂ Me	MeSO	H
20	Et	Me	Cl	CH ₂ SO ₂ Et	Ms	H
	Et	Me	Cl	CH ₂ SO ₂ Et	Cl	H
	Et	Me	Cl	CH ₂ SO ₂ Et	MeS	H
	Et	Me	Cl	CH ₂ SO ₂ Et	MeSO	H
25	Et	Me	Cl	CHMeSMe	Ms	H
	Et	Me	Cl	CHMeSEt	Ms	H
	Et	Me	Cl	CHMeSO ₂ Me	Ms	H
	Et	Me	Cl	CHMeSO ₂ Et	Ms	H
	Et	Me	Cl	CH ₂ SCH ₂ CH ₂ OMe	Ms	H
30	Et	Me	Cl	CH ₂ OCOMe	Ms	H
	Et	Me	Cl	CH ₂ OCOEt	Ms	H
	Et	Me	Cl	CHMeOCOMe	Ms	H
	Et	Me	Cl	CH ₂ OSO ₂ Me	Ms	H
	Et	Me	Cl	CH ₂ OSO ₂ Et	Ms	H
35	Et	Me	Cl	CHMeOSO ₂ Me	Ms	H
	Pr-i	Me	Cl	CH ₂ OH	Ms	H
	Pr-i	Me	Cl	CH ₂ OMe	Ms	H
	Pr-i	Me	Cl	CH ₂ OMe	Cl	H
40	Pr-i	Me	Cl	CH ₂ OMe	MeS	H
	Pr-i	Me	Cl	CH ₂ OMe	MeSO	H
	Pr-i	Me	Cl	CH ₂ OMe	Ms	Q1
	Pr-i	Me	Cl	CH ₂ OMe	Cl	Q1
	Pr-i	Me	Cl	CH ₂ OMe	MeS	Q1
45	Pr-i	Me	Cl	CH ₂ OMe	MeSO	Q2
	Pr-i	Me	Cl	CH ₂ OMe	MeS	Q2
	Pr-i	Me	Cl	CH ₂ OMe	MeSO	Q2
	Pr-i	Me	Cl	CH ₂ OMe	Ms	Q3
50						
55						

	A	E	X	Y	Z	Q
5	Pr-i	Me	Cl	CH ₂ OMe	MeS	Q3
	Pr-i	Me	Cl	CH ₂ OMe	MeSO	Q3
	Pr-i	Me	Cl	CH ₂ OEt	Ms	H
	Pr-i	Me	Cl	CH ₂ OEt	Cl	H
10	Pr-i	Me	Cl	CH ₂ OEt	MeS	H
	Pr-i	Me	Cl	CH ₂ OEt	MeSO	H
	Pr-i	Me	Cl	CH ₂ OEt	Ms	Q1
	Pr-i	Me	Cl	CH ₂ OEt	MeS	Q1
15	Pr-i	Me	Cl	CH ₂ OEt	MeSO	Q1
	Pr-i	Me	Cl	CH ₂ OEt	Ms	Q2
	Pr-i	Me	Cl	CH ₂ OEt	MeS	Q2
	Pr-i	Me	Cl	CH ₂ OEt	MeSO	Q2
	Pr-i	Me	Cl	CH ₂ OEt	Ms	Q3
20	Pr-i	Me	Cl	CH ₂ OEt	MeS	Q3
	Pr-i	Me	Cl	CH ₂ OEt	MeSO	Q3
	Pr-i	Me	Cl	CH ₂ OPr-i	Ms	H
	Pr-i	Me	Cl	CH ₂ OPr-i	Cl	H
	Pr-i	Me	Cl	CH ₂ OPr-i	MeS	H
25	Pr-i	Me	Cl	CH ₂ OPr-i	MeSO	H
	Pr-i	Me	Cl	CH ₂ OPr-i	Ms	Q1
	Pr-i	Me	Cl	CH ₂ OPr-i	Ms	Q2
	Pr-i	Me	Cl	CH ₂ OPr-i	Ms	Q3
30	Pr-i	Me	Cl	CH ₂ OPr-n	Ms	H
	Pr-i	Me	Cl	CH ₂ OCH=CH ₂	Ms	H
	Pr-i	Me	Cl	CH ₂ OCH ₂ CH=CH ₂	Ms	H
	Pr-i	Me	Cl	CH ₂ OCH ₂ C≡CH	Ms	H
	Pr-i	Me	Cl	CH ₂ OCH ₂ CH ₂ Cl	Ms	H
35	Pr-i	Me	Cl	CH ₂ O-Y5	Ms	H
	Pr-i	Me	Cl	CHMeOH	Ms	H
	Pr-i	Me	Cl	CHMeOMe	Ms	H
	Pr-i	Me	Cl	CHMeOMe	Cl	H
	Pr-i	Me	Cl	CHMeOMe	MeS	H
40	Pr-i	Me	Cl	CHMeOMe	MeSO	H
	Pr-i	Me	Cl	CHMeOMe	Ms	Q1
	Pr-i	Me	Cl	CHMeOMe	Ms	Q2
	Pr-i	Me	Cl	CHMeOMe	Ms	Q3
45	Pr-i	Me	Cl	CHMeOEt	Ms	H
	Pr-i	Me	Cl	CHMeOEt	Cl	H
	Pr-i	Me	Cl	CHMeOEt	MeS	H
	Pr-i	Me	Cl	CHMeOEt	MeSO	H

50

55

	A	B	X	Y	Z	Q
5	Pr-i	Me	Cl	CHMeOEt	Ms	Q1
	Pr-i	Me	Cl	CHMeOEt	Ms	Q2
	Pr-i	Me	Cl	CHMeOEt	Ms	Q3
	Pr-i	Me	Cl	CHMeOPr-i	Ms	H
10	Pr-i	Me	Cl	CHMeOPr-i	Cl	H
	Pr-i	Me	Cl	CHMeOPr-i	MeS	H
	Pr-i	Me	Cl	CHMeOPr-i	MeSO	H
	Pr-i	Me	Cl	CHMeOPr-n	Ms	H
15	Pr-i	Me	Cl	CHMeOCH=CH ₂	Ms	H
	Pr-i	Me	Cl	CHMeOCH=CH ₂	Ms	H
	Pr-i	Me	Cl	CHMeOCH ₂ CH=CH ₂	Ms	H
	Pr-i	Me	Cl	CHMeOCH ₂ C≡CH	Ms	H
	Pr-i	Me	Cl	CHMeOCH ₂ CH ₂ Cl	Ms	H
20	Pr-i	Me	Cl	CHMeO-Y5	Ms	H
	Pr-i	Me	Cl	CMe ₂ OH	Ms	H
	Pr-i	Me	Cl	CMe ₂ OMe	Ms	H
	Pr-i	Me	Cl	CMe ₂ OEt	Ms	H
	Pr-i	Me	Cl	CMe ₂ OPr-i	Ms	H
25	Pr-i	Me	Cl	CH ₂ CH ₂ OMe	Ms	H
	Pr-i	Me	Cl	CH ₂ CH ₂ OEt	Ms	H
	Pr-i	Me	Cl	CH ₂ CH ₂ OPr-i	Ms	H
	Pr-i	Me	Cl	CHEtOH	Ms	H
30	Pr-i	Me	Cl	CHEtOMe	Ms	H
	Pr-i	Me	Cl	CHEtOMe	Cl	H
	Pr-i	Me	Cl	CHEtOMe	MeS	H
	Pr-i	Me	Cl	CHEtOMe	MeSO	H
	Pr-i	Me	Cl	CHEtOEt	Ms	H
35	Pr-i	Me	Cl	CHEtOPr-i	Ms	H
	Pr-i	Me	Cl	CH ₂ OCH ₂ CH ₂ OMe	Ms	H
	Pr-i	Me	Cl	CH ₂ OCH ₂ CH ₂ OMe	Cl	H
	Pr-i	Me	Cl	CH ₂ OCH ₂ CH ₂ OMe	MeS	H
40	Pr-i	Me	Cl	CH ₂ OCH ₂ CH ₂ OMe	MeSO	H
	Pr-i	Me	Cl	CH ₂ OCH ₂ CH ₂ OEt	Ms	H
	Pr-i	Me	Cl	CHMeOCH ₂ CH ₂ OMe	Ms	H
	Pr-i	Me	Cl	CH ₂ O-Y8	Ms	H
	Pr-i	Me	Cl	CH ₂ O-Y9	Ms	H
45	Pr-i	Me	Cl	CH ₂ O-Y10	Ms	H
	Pr-i	Me	Cl	CHMeO-Y8	Ms	H
	Pr-i	Me	Cl	CHMeO-Y9	Ms	H
	Pr-i	Me	Cl	CHMeO-Y10	Ms	H

50

55

	A	B	X	Y	Z	Q
5	Pr-i	Me	Cl	CH ₂ O-Y13	Ms	H
	Pr-i	Me	Cl	CHMeO-Y13	Ms	H
	Pr-i	Me	Cl	CH ₂ NMe ₂	Ms	H
	Pr-i	Me	Cl	CH ₂ -Y14	Ms	H
10	Pr-i	Me	Cl	CHMeNMe ₂	Ms	H
	Pr-i	Me	Cl	CH ₂ CH ₂ NMe ₂	Ms	H
	Pr-i	Me	Cl	CH ₂ OCH ₂ Ph	Ms	H
	Pr-i	Me	Cl	CHMeOCH ₂ Ph	Ms	H
15	Pr-i	Me	Cl	CH ₂ OCH ₂ CO ₂ Me	Ms	H
	Pr-i	Me	Cl	CH ₂ OCH ₂ CO ₂ Et	Ms	H
	Pr-i	Me	Cl	CH ₂ OCHMeCO ₂ Me	Ms	H
	Pr-i	Me	Cl	CH ₂ CN	Ms	H
	Pr-i	Me	Cl	CHMeCN	Ms	H
20	Pr-i	Me	Cl	CH ₂ SMe	Ms	H
	Pr-i	Me	Cl	CH ₂ SMe	Cl	H
	Pr-i	Me	Cl	CH ₂ SMe	MeS	H
	Pr-i	Me	Cl	CH ₂ SMe	MeSO	H
25	Pr-i	Me	Cl	CH ₂ SEt	Ms	H
	Pr-i	Me	Cl	CH ₂ SEt	Cl	H
	Pr-i	Me	Cl	CH ₂ SEt	MeS	H
	Pr-i	Me	Cl	CH ₂ SEt	MeSO	H
	Pr-i	Me	Cl	CH ₂ SOMe	Ms	H
30	Pr-i	Me	Cl	CH ₂ SOEt	Ms	H
	Pr-i	Me	Cl	CH ₂ SO ₂ Me	Ms	H
	Pr-i	Me	Cl	CH ₂ SO ₂ Me	Cl	H
	Pr-i	Me	Cl	CH ₂ SO ₂ Me	MeS	H
	Pr-i	Me	Cl	CH ₂ SO ₂ Me	MeSO	H
35	Pr-i	Me	Cl	CH ₂ SO ₂ Et	Ms	H
	Pr-i	Me	Cl	CH ₂ SO ₂ Et	Cl	H
	Pr-i	Me	Cl	CH ₂ SO ₂ Et	MeS	H
	Pr-i	Me	Cl	CH ₂ SO ₂ Et	MeSO	H
40	Pr-i	Me	Cl	CHMeSMe	Ms	H
	Pr-i	Me	Cl	CHMeSEt	Ms	H
	Pr-i	Me	Cl	CHMeSO ₂ Me	Ms	H
	Pr-i	Me	Cl	CHMeSO ₂ Et	Ms	H
	Pr-i	Me	Cl	CH ₂ SCH ₂ CH ₂ OMe	Ms	H
45	Pr-i	Me	Cl	CH ₂ OCOMe	Ms	H
	Pr-i	Me	Cl	CH ₂ OCOEt	Ms	H
	Pr-i	Me	Cl	CHMeOCOMe	Ms	H
	Pr-i	Me	Cl	CH ₂ OSO ₂ Me	Ms	H
	Pr-i	Me	Cl	CH ₂ OSO ₂ Et	Ms	H
50	Pr-i	Me	Cl	CHMeOSO ₂ Me	Ms	H

	A	B	X	Y	Z	Q
5	Me	Me	MeO	CH ₂ OH	Ms	H
	Me	Me	MeO	CH ₂ OMe	Ms	H
	Me	Me	MeO	CH ₂ OMe	Cl	H
10	Me	Me	MeO	CH ₂ OMe	MeS	H
	Me	Me	MeO	CH ₂ OMe	MeSO	H
	Me	Me	MeO	CH ₂ OMe	Ms	Q1
	Me	Me	MeO	CH ₂ OMe	Cl	Q1
	Me	Me	MeO	CH ₂ OMe	MeS	Q1
15	Me	Me	MeO	CH ₂ OMe	MeSO	Q2
	Me	Me	MeO	CH ₂ OMe	MeS	Q2
	Me	Me	MeO	CH ₂ OMe	MeSO	Q2
	Me	Me	MeO	CH ₂ OMe	Ms	Q3
20	Me	Me	MeO	CH ₂ OMe	MeS	Q3
	Me	Me	MeO	CH ₂ OMe	MeSO	Q3
	Me	Me	MeO	CH ₂ OEt	Ms	H
	Me	Me	MeO	CH ₂ OEt	Cl	H
	Me	Me	MeO	CH ₂ OEt	MeS	H
25	Me	Me	MeO	CH ₂ OEt	MeSO	H
	Me	Me	MeO	CH ₂ OEt	Ms	Q1
	Me	Me	MeO	CH ₂ OEt	MeS	Q1
	Me	Me	MeO	CH ₂ OEt	MeSO	Q1
30	Me	Me	MeO	CH ₂ OEt	Ms	Q2
	Me	Me	MeO	CH ₂ OEt	MeS	Q2
	Me	Me	MeO	CH ₂ OEt	MeSO	Q2
	Me	Me	MeO	CH ₂ OEt	Ms	Q3
	Me	Me	MeO	CH ₂ OEt	MeS	Q3
35	Me	Me	MeO	CH ₂ OEt	MeSO	Q3
	Me	Me	MeO	CH ₂ OPr-i	Ms	H
	Me	Me	MeO	CH ₂ OPr-i	Cl	H
	Me	Me	MeO	CH ₂ OPr-i	MeS	H
	Me	Me	MeO	CH ₂ OPr-i	MeSO	H
40	Me	Me	MeO	CH ₂ OPr-i	Ms	Q1
	Me	Me	MeO	CH ₂ OPr-i	Ms	Q2
	Me	Me	MeO	CH ₂ OPr-i	Ms	Q3
	Me	Me	MeO	CH ₂ OPr-n	Ms	H
	Me	Me	MeO	CH ₂ OCH=CH ₂	Ms	H
45	Me	Me	MeO	CH ₂ OCH ₂ CH=CH ₂	Ms	H
	Me	Me	MeO	CH ₂ OCH ₂ C≡CH	Ms	H
	Me	Me	MeO	CH ₂ OCH ₂ CH ₂ Cl	Ms	H
	Me	Me	MeO	CH ₂ O-Y5	Ms	H
50						
55						

	A	B	X	Y	Z	Q
5	Me	Me	MeO	CHMeOH	Ms	H
	Me	Me	MeO	CHMeOMe	Ms	H
	Me	Me	MeO	CHMeOMe	Cl	H
	Me	Me	MeO	CHMeOMe	MeS	H
10	Me	Me	MeO	CHMeOMe	MeSO	H
	Me	Me	MeO	CHMeOMe	Ms	Q1
	Me	Me	MeO	CHMeOMe	Ms	Q2
	Me	Me	MeO	CHMeOMe	Ms	Q3
15	Me	Me	MeO	CHMeOEt	Ms	H
	Me	Me	MeO	CHMeOEt	Cl	H
	Me	Me	MeO	CHMeOEt	MeS	H
	Me	Me	MeO	CHMeOEt	MeSO	H
	Me	Me	MeO	CHMeOEt	Ms	Q1
20	Me	Me	MeO	CHMeOEt	Ms	Q2
	Me	Me	MeO	CHMeOEt	Ms	Q3
	Me	Me	MeO	CHMeOPr-i	Ms	H
	Me	Me	MeO	CHMeOPr-i	Cl	H
25	Me	Me	MeO	CHMeOPr-i	MeS	H
	Me	Me	MeO	CHMeOPr-i	MeSO	H
	Me	Me	MeO	CHMeOPr-n	Ms	H
	Me	Me	MeO	CHMeOCH=CH ₂	Ms	H
	Me	Me	MeO	CHMeOCH=CH ₂	Ms	H
30	Me	Me	MeO	CHMeOCH ₂ CH=CH ₂	Ms	H
	Me	Me	MeO	CHMeOCH ₂ C≡CH	Ms	H
	Me	Me	MeO	CHMeOCH ₂ CH ₂ Cl	Ms	H
	Me	Me	MeO	CHMeO-Y5	Ms	H
	Me	Me	MeO	CMe ₂ OH	Ms	H
35	Me	Me	MeO	CMe ₂ OMe	Ms	H
	Me	Me	MeO	CMe ₂ OEt	Ms	H
	Me	Me	MeO	CMe ₂ OPr-i	Ms	H
	Me	Me	MeO	CH ₂ CH ₂ OMe	Ms	H
40	Me	Me	MeO	CH ₂ CH ₂ OEt	Ms	H
	Me	Me	MeO	CH ₂ CH ₂ OPr-i	Ms	H
	Me	Me	MeO	CHEtOH	Ms	H
	Me	Me	MeO	CHEtOMe	Ms	H
	Me	Me	MeO	CHEtOMe	Cl	H
45	Me	Me	MeO	CHEtOMe	MeS	H
	Me	Me	MeO	CHEtOMe	MeSO	H
	Me	Me	MeO	CHEtOEt	Ms	H
	Me	Me	MeO	CHEtOPr-i	Ms	H

50

55

	A	B	X	Y	Z	Q
5	Me	Me	MeO	CH ₂ OCH ₂ CH ₂ OMe	Ms	H
	Me	Me	MeO	CH ₂ OCH ₂ CH ₂ OMe	Cl	H
	Me	Me	MeO	CH ₂ OCH ₂ CH ₂ OMe	MeS	H
	Me	Me	MeO	CH ₂ OCH ₂ CH ₂ OMe	MeSO	H
10	Me	Me	MeO	CH ₂ OCH ₂ CH ₂ OE t	Ms	H
	Me	Me	MeO	CHMeOCH ₂ CH ₂ OMe	Ms	H
	Me	Me	MeO	CH ₂ O-Y8	Ms	H
	Me	Me	MeO	CH ₂ O-Y9	Ms	H
15	Me	Me	MeO	CH ₂ O-Y10	Ms	H
	Me	Me	MeO	CHMeO-Y8	Ms	H
	Me	Me	MeO	CHMeO-Y9	Ms	H
	Me	Me	MeO	CHMeO-Y10	Ms	H
	Me	Me	MeO	CH ₂ O-Y13	Ms	H
20	Me	Me	MeO	CHMeO-Y13	Ms	H
	Me	Me	MeO	CH ₂ NMe ₂	Ms	H
	Me	Me	MeO	CH ₂ -Y14	Ms	H
	Me	Me	MeO	CHMeNMe ₂	Ms	H
25	Me	Me	MeO	CH ₂ CH ₂ NMe ₂	Ms	H
	Me	Me	MeO	CH ₂ OCH ₂ Ph	Ms	H
	Me	Me	MeO	CHMeOCH ₂ Ph	Ms	H
	Me	Me	MeO	CH ₂ OCH ₂ CO ₂ Me	Ms	H
	Me	Me	MeO	CH ₂ OCH ₂ CO ₂ Et	Ms	H
30	Me	Me	MeO	CH ₂ OCHMeCO ₂ Me	Ms	H
	Me	Me	MeO	CH ₂ CN	Ms	H
	Me	Me	MeO	CHMeCN	Ms	H
	Me	Me	MeO	CH ₂ SMe	Ms	H
35	Me	Me	MeO	CH ₂ SMe	Cl	H
	Me	Me	MeO	CH ₂ SMe	MeS	H
	Me	Me	MeO	CH ₂ SMe	MeSO	H
	Me	Me	MeO	CH ₂ SE t	Ms	H
	Me	Me	MeO	CH ₂ SE t	Cl	H
40	Me	Me	MeO	CH ₂ SE t	MeS	H
	Me	Me	MeO	CH ₂ SE t	MeSO	H
	Me	Me	MeO	CH ₂ SOMe	Ms	H
	Me	Me	MeO	CH ₂ SOEt	Ms	H
	Me	Me	MeO	CH ₂ SO ₂ Me	Ms	H
45	Me	Me	MeO	CH ₂ SO ₂ Me	Cl	H
	Me	Me	MeO	CH ₂ SO ₂ Me	MeS	H
	Me	Me	MeO	CH ₂ SO ₂ Me	MeSO	H
	Me	Me	MeO	CH ₂ SO ₂ Et	Ms	H

50

55

	A	B	X	Y	Z	Q
5	Me	Me	MeO	CH ₂ SO ₂ Et	Cl	H
	Me	Me	MeO	CH ₂ SO ₂ Et	MeS	H
	Me	Me	MeO	CH ₂ SO ₂ Et	MeSO	H
	Me	Me	MeO	CHMeSMe	Ms	H
10	Me	Me	MeO	CHMeSEt	Ms	H
	Me	Me	MeO	CHMeSO ₂ Me	Ms	H
	Me	Me	MeO	CHMeSO ₂ Et	Ms	H
	Me	Me	MeO	CH ₂ SCH ₂ CH ₂ OMe	Ms	H
	Me	Me	MeO	CH ₂ OCOMe	Ms	H
15	Me	Me	MeO	CH ₂ OCOEt	Ms	H
	Me	Me	MeO	CHMeOCOMe	Ms	H
	Me	Me	MeO	CH ₂ OSO ₂ Me	Ms	H
	Me	Me	MeO	CH ₂ OSO ₂ Et	Ms	H
20	Me	Me	MeO	CHMeOSO ₂ Me	Ms	H
	Et	Me	MeO	CH ₂ OH	Ms	H
	Et	Me	MeO	CH ₂ OMe	Ms	H
	Et	Me	MeO	CH ₂ OMe	Cl	H
	Et	Me	MeO	CH ₂ OMe	MeS	H
25	Et	Me	MeO	CH ₂ OMe	MeSO	H
	Et	Me	MeO	CH ₂ OMe	Ms	Q1
	Et	Me	MeO	CH ₂ OMe	Cl	Q1
	Et	Me	MeO	CH ₂ OMe	MeS	Q1
30	Et	Me	MeO	CH ₂ OMe	MeSO	Q2
	Et	Me	MeO	CH ₂ OMe	MeS	Q2
	Et	Me	MeO	CH ₂ OMe	MeSO	Q2
	Et	Me	MeO	CH ₂ OMe	Ms	Q3
	Et	Me	MeO	CH ₂ OMe	MeS	Q3
35	Et	Me	MeO	CH ₂ OMe	MeSO	Q3
	Et	Me	MeO	CH ₂ OEt	Ms	H
	Et	Me	MeO	CH ₂ OEt	Cl	H
	Et	Me	MeO	CH ₂ OEt	MeS	H
	Et	Me	MeO	CH ₂ OEt	MeSO	H
40	Et	Me	MeO	CH ₂ OEt	Ms	Q1
	Et	Me	MeO	CH ₂ OEt	MeS	Q1
	Et	Me	MeO	CH ₂ OEt	MeSO	Q1
	Et	Me	MeO	CH ₂ OEt	Ms	Q2
45	Et	Me	MeO	CH ₂ OEt	MeS	Q2
	Et	Me	MeO	CH ₂ OEt	MeSO	Q2
	Et	Me	MeO	CH ₂ OEt	Ms	Q3
	Et	Me	MeO	CH ₂ OEt	MeS	Q3

50

55

	A	B	X	Y	Z	Q
5	Et	Me	MeO	CH ₂ OEt	MeSO	Q3
	Et	Me	MeO	CH ₂ OPr-i	Ms	H
	Et	Me	MeO	CH ₂ OPr-i	Cl	H
	Et	Me	MeO	CH ₂ OPr-i	MeS	H
10	Et	Me	MeO	CH ₂ OPr-i	MeSO	H
	Et	Me	MeO	CH ₂ OPr-i	Ms	Q1
	Et	Me	MeO	CH ₂ OPr-i	Ms	Q2
	Et	Me	MeO	CH ₂ OPr-i	Ms	Q3
15	Et	Me	MeO	CH ₂ OPr-n	Ms	H
	Et	Me	MeO	CH ₂ OCH=CH ₂	Ms	H
	Et	Me	MeO	CH ₂ OCH ₂ CH=CH ₂	Ms	H
	Et	Me	MeO	CH ₂ OCH ₂ C≡CH	Ms	H
	Et	Me	MeO	CH ₂ OCH ₂ CH ₂ Cl	Ms	H
20	Et	Me	MeO	CH ₂ O-Y5	Ms	H
	Et	Me	MeO	CHMeOH	Ms	H
	Et	Me	MeO	CHMeOMe	Ms	H
	Et	Me	MeO	CHMeOMe	Cl	H
25	Et	Me	MeO	CHMeOMe	MeS	H
	Et	Me	MeO	CHMeOMe	MeSO	H
	Et	Me	MeO	CHMeOMe	Ms	Q1
	Et	Me	MeO	CHMeOMe	Ms	Q2
	Et	Me	MeO	CHMeOMe	Ms	Q3
30	Et	Me	MeO	CHMeOEt	Ms	H
	Et	Me	MeO	CHMeOEt	Cl	H
	Et	Me	MeO	CHMeOEt	MeS	H
	Et	Me	MeO	CHMeOEt	MeSO	H
35	Et	Me	MeO	CHMeOEt	Ms	Q1
	Et	Me	MeO	CHMeOEt	Ms	Q2
	Et	Me	MeO	CHMeOEt	Ms	Q3
	Et	Me	MeO	CHMeOPr-i	Ms	H
	Et	Me	MeO	CHMeOPr-i	Cl	H
40	Et	Me	MeO	CHMeOPr-i	MeS	H
	Et	Me	MeO	CHMeOPr-i	MeSO	H
	Et	Me	MeO	CHMeOPr-n	Ms	H
	Et	Me	MeO	CHMeOCH=CH ₂	Ms	H
45	Et	Me	MeO	CHMeOCH=CH ₂	Ms	H
	Et	Me	MeO	CHMeOCH ₂ CH=CH ₂	Ms	H
	Et	Me	MeO	CHMeOCH ₂ C≡CH	Ms	H
	Et	Me	MeO	CHMeOCH ₂ CH ₂ Cl	Ms	H
	Et	Me	MeO	CHMeO-Y5	Ms	H
50						
55						

	A	B	X	Y	Z	Q
5	Et	Me	MeO	CMe ₂ OH	Ms	H
	Et	Me	MeO	CMe ₂ OMe	Ms	H
	Et	Me	MeO	CMe ₂ OE _t	Ms	H
	Et	Me	MeO	CMe ₂ OPr-i	Ms	H
10	Et	Me	MeO	CH ₂ CH ₂ OMe	Ms	H
	Et	Me	MeO	CH ₂ CH ₂ OE _t	Ms	H
	Et	Me	MeO	CH ₂ CH ₂ OPr-i	Ms	H
	Et	Me	MeO	CHEtOH	Ms	H
15	Et	Me	MeO	CHEtOMe	Ms	H
	Et	Me	MeO	CHEtOMe	Cl	H
	Et	Me	MeO	CHEtOMe	MeS	H
	Et	Me	MeO	CHEtOMe	MeSO	H
	Et	Me	MeO	CHEtOE _t	Ms	H
20	Et	Me	MeO	CHEtOPr-i	Ms	H
	Et	Me	MeO	CH ₂ OCH ₂ CH ₂ OMe	Ms	H
	Et	Me	MeO	CH ₂ OCH ₂ CH ₂ OMe	Cl	H
	Et	Me	MeO	CH ₂ OCH ₂ CH ₂ OMe	MeS	H
25	Et	Me	MeO	CH ₂ OCH ₂ CH ₂ OMe	MeSO	H
	Et	Me	MeO	CH ₂ OCH ₂ CH ₂ OE _t	Ms	H
	Et	Me	MeO	CHMeOCH ₂ CH ₂ OMe	Ms	H
	Et	Me	MeO	CH ₂ O-Y8	Ms	H
	Et	Me	MeO	CH ₂ O-Y9	Ms	H
30	Et	Me	MeO	CH ₂ O-Y10	Ms	H
	Et	Me	MeO	CHMeO-Y8	Ms	H
	Et	Me	MeO	CHMeO-Y9	Ms	H
	Et	Me	MeO	CHMeO-Y10	Ms	H
	Et	Me	MeO	CH ₂ O-Y13	Ms	H
35	Et	Me	MeO	CHMeO-Y13	Ms	H
	Et	Me	MeO	CH ₂ NMe ₂	Ms	H
	Et	Me	MeO	CH ₂ -Y14	Ms	H
	Et	Me	MeO	CHMeNMe ₂	Ms	H
40	Et	Me	MeO	CH ₂ CH ₂ NMe ₂	Ms	H
	Et	Me	MeO	CH ₂ OCH ₂ Ph	Ms	H
	Et	Me	MeO	CHMeOCH ₂ Ph	Ms	H
	Et	Me	MeO	CH ₂ OCH ₂ CO ₂ Me	Ms	H
	Et	Me	MeO	CH ₂ OCH ₂ CO ₂ Et	Ms	H
45	Et	Me	MeO	CH ₂ OCHMeCO ₂ Me	Ms	H
	Et	Me	MeO	CH ₂ CN	Ms	H
	Et	Me	MeO	CHMeCN	Ms	H
	Et	Me	MeO	CH ₂ SMe	Ms	H

50

55

	A	B	X	Y	Z	Q
5	Et	Me	MeO	CH ₂ SMe	Cl	H
	Et	Me	MeO	CH ₂ SMe	MeS	H
	Et	Me	MeO	CH ₂ SMe	MeSO	H
10	Et	Me	MeO	CH ₂ SEt	Ms	H
	Et	Me	MeO	CH ₂ SEt	Cl	H
	Et	Me	MeO	CH ₂ SEt	MeS	H
	Et	Me	MeO	CH ₂ SEt	MeSO	H
15	Et	Me	MeO	CH ₂ SOMe	Ms	H
	Et	Me	MeO	CH ₂ SOEt	Ms	H
	Et	Me	MeO	CH ₂ SO ₂ Me	Ms	H
	Et	Me	MeO	CH ₂ SO ₂ Me	Cl	H
	Et	Me	MeO	CH ₂ SO ₂ Me	MeS	H
20	Et	Me	MeO	CH ₂ SO ₂ Me	MeSO	H
	Et	Me	MeO	CH ₂ SO ₂ Et	Ms	H
	Et	Me	MeO	CH ₂ SO ₂ Et	Cl	H
	Et	Me	MeO	CH ₂ SO ₂ Et	MeS	H
	Et	Me	MeO	CH ₂ SO ₂ Et	MeSO	H
25	Et	Me	MeO	CHMeSMe	Ms	H
	Et	Me	MeO	CHMeSEt	Ms	H
	Et	Me	MeO	CHMeSO ₂ Me	Ms	H
	Et	Me	MeO	CHMeSO ₂ Et	Ms	H
	Et	Me	MeO	CH ₂ SCH ₂ CH ₂ OMe	Ms	H
30	Et	Me	MeO	CH ₂ OCOMe	Ms	H
	Et	Me	MeO	CH ₂ OCOEt	Ms	H
	Et	Me	MeO	CHMeOCOMe	Ms	H
	Et	Me	MeO	CH ₂ OSO ₂ Me	Ms	H
	Et	Me	MeO	CH ₂ OSO ₂ Et	Ms	H
35	Et	Me	MeO	CHMeOSO ₂ Me	Ms	H
	Pr-i	Me	MeO	CH ₂ OH	Ms	H
	Pr-i	Me	MeO	CH ₂ OMe	Ms	H
	Pr-i	Me	MeO	CH ₂ OMe	Cl	H
40	Pr-i	Me	MeO	CH ₂ OMe	MeS	H
	Pr-i	Me	MeO	CH ₂ OMe	MeSO	H
	Pr-i	Me	MeO	CH ₂ OMe	Ms	Q1
	Pr-i	Me	MeO	CH ₂ OMe	Cl	Q1
	Pr-i	Me	MeO	CH ₂ OMe	MeS	Q1
45	Pr-i	Me	MeO	CH ₂ OMe	MeSO	Q2
	Pr-i	Me	MeO	CH ₂ OMe	MeS	Q2
	Pr-i	Me	MeO	CH ₂ OMe	MeSO	Q2
	Pr-i	Me	MeO	CH ₂ OMe	Ms	Q3
50						
55						

	A	B	X	Y	Z	Q
5	Pr-i	Me	MeO	CH ₂ OMe	MeS	Q3
	Pr-i	Me	MeO	CH ₂ OMe	MeSO	Q3
	Pr-i	Me	MeO	CH ₂ OEt	Ms	H
10	Pr-i	Me	MeO	CH ₂ OEt	Cl	H
	Pr-i	Me	MeO	CH ₂ OEt	MeS	H
	Pr-i	Me	MeO	CH ₂ OEt	MeSO	H
	Pr-i	Me	MeO	CH ₂ OEt	Ms	Q1
	Pr-i	Me	MeO	CH ₂ OEt	MeS	Q1
15	Pr-i	Me	MeO	CH ₂ OEt	MeSO	Q1
	Pr-i	Me	MeO	CH ₂ OEt	Ms	Q2
	Pr-i	Me	MeO	CH ₂ OEt	MeS	Q2
	Pr-i	Me	MeO	CH ₂ OEt	MeSO	Q2
20	Pr-i	Me	MeO	CH ₂ OEt	Ms	Q3
	Pr-i	Me	MeO	CH ₂ OEt	MeS	Q3
	Pr-i	Me	MeO	CH ₂ OEt	MeSO	Q3
	Pr-i	Me	MeO	CH ₂ OPr-i	Ms	H
	Pr-i	Me	MeO	CH ₂ OPr-i	Cl	H
25	Pr-i	Me	MeO	CH ₂ OPr-i	MeS	H
	Pr-i	Me	MeO	CH ₂ OPr-i	MeSO	H
	Pr-i	Me	MeO	CH ₂ OPr-i	Ms	Q1
	Pr-i	Me	MeO	CH ₂ OPr-i	Ms	Q2
	Pr-i	Me	MeO	CH ₂ OPr-i	Ms	Q3
30	Pr-i	Me	MeO	CH ₂ OPr-n	Ms	H
	Pr-i	Me	MeO	CH ₂ OCH=CH ₂	Ms	H
	Pr-i	Me	MeO	CH ₂ OCH ₂ CH=CH ₂	Ms	H
	Pr-i	Me	MeO	CH ₂ OCH ₂ C≡CH	Ms	H
	Pr-i	Me	MeO	CH ₂ OCH ₂ CH ₂ Cl	Ms	H
35	Pr-i	Me	MeO	CH ₂ O-Y5	Ms	H
	Pr-i	Me	MeO	CHMeOH	Ms	H
	Pr-i	Me	MeO	CHMeOMe	Ms	H
	Pr-i	Me	MeO	CHMeOMe	Cl	H
40	Pr-i	Me	MeO	CHMeOMe	MeS	H
	Pr-i	Me	MeO	CHMeOMe	MeSO	H
	Pr-i	Me	MeO	CHMeOMe	Ms	Q1
	Pr-i	Me	MeO	CHMeOMe	Ms	Q2
	Pr-i	Me	MeO	CHMeOMe	Ms	Q3
45	Pr-i	Me	MeO	CHMeOEt	Ms	H
	Pr-i	Me	MeO	CHMeOEt	Cl	H
	Pr-i	Me	MeO	CHMeOEt	MeS	H
	Pr-i	Me	MeO	CHMeOEt	MeSO	H

50

55

	A	B	X	Y	Z	Q
5	Pr-i	Me	MeO	CHMeOEt	Ms	Q1
	Pr-i	Me	MeO	CHMeOEt	Ms	Q2
	Pr-i	Me	MeO	CHMeOEt	Ms	Q3
	Pr-i	Me	MeO	CHMeOPr-i	Ms	H
10	Pr-i	Me	MeO	CHMeOPr-i	Cl	H
	Pr-i	Me	MeO	CHMeOPr-i	MeS	H
	Pr-i	Me	MeO	CHMeOPr-i	MeSO	H
	Pr-i	Me	MeO	CHMeOPr-n	Ms	H
15	Pr-i	Me	MeO	CHMeOCH=CH ₂	Ms	H
	Pr-i	Me	MeO	CHMeOCH=CH ₂	Ms	H
	Pr-i	Me	MeO	CHMeOCH ₂ CH=CH ₂	Ms	H
	Pr-i	Me	MeO	CHMeOCH ₂ C≡CH	Ms	H
	Pr-i	Me	MeO	CHMeOCH ₂ CH ₂ Cl	Ms	H
20	Pr-i	Me	MeO	CHMeO-Y5	Ms	H
	Pr-i	Me	MeO	CMe ₂ OH	Ms	H
	Pr-i	Me	MeO	CMe ₂ OMe	Ms	H
	Pr-i	Me	MeO	CMe ₂ OEt	Ms	H
	Pr-i	Me	MeO	CMe ₂ OPr-i	Ms	H
25	Pr-i	Me	MeO	CH ₂ CH ₂ OMe	Ms	H
	Pr-i	Me	MeO	CH ₂ CH ₂ OEt	Ms	H
	Pr-i	Me	MeO	CH ₂ CH ₂ OPr-i	Ms	H
	Pr-i	Me	MeO	CHEtOH	Ms	H
30	Pr-i	Me	MeO	CHEtOMe	Ms	H
	Pr-i	Me	MeO	CHEtOMe	Cl	H
	Pr-i	Me	MeO	CHEtOMe	MeS	H
	Pr-i	Me	MeO	CHEtOMe	MeSO	H
	Pr-i	Me	MeO	CHEtOEt	Ms	H
35	Pr-i	Me	MeO	CHEtOPr-i	Ms	H
	Pr-i	Me	MeO	CH ₂ OCH ₂ CH ₂ OMe	Ms	H
	Pr-i	Me	MeO	CH ₂ OCH ₂ CH ₂ OMe	Cl	H
	Pr-i	Me	MeO	CH ₂ OCH ₂ CH ₂ OMe	MeS	H
	Pr-i	Me	MeO	CH ₂ OCH ₂ CH ₂ OMe	MeSO	H
40	Pr-i	Me	MeO	CH ₂ OCH ₂ CH ₂ OEt	Ms	H
	Pr-i	Me	MeO	CHMeOCH ₂ CH ₂ OMe	Ms	H
	Pr-i	Me	MeO	CH ₂ O-Y8	Ms	H
	Pr-i	Me	MeO	CH ₂ O-Y9	Ms	H
45	Pr-i	Me	MeO	CH ₂ O-Y10	Ms	H
	Pr-i	Me	MeO	CHMeO-Y8	Ms	H
	Pr-i	Me	MeO	CHMeO-Y9	Ms	H
	Pr-i	Me	MeO	CHMeO-Y10	Ms	H

50

55

	A	B	X	Y	Z	Q
5	Pr-i	Me	MeO	CH ₂ O-Y13	Ms	H
	Pr-i	Me	MeO	CHMeO-Y13	Ms	H
	Pr-i	Me	MeO	CH ₂ NMe ₂	Ms	H
	Pr-i	Me	MeO	CH ₂ -Y14	Ms	H
10	Pr-i	Me	MeO	CHMeNMe ₂	Ms	H
	Pr-i	Me	MeO	CH ₂ CH ₂ NMe ₂	Ms	H
	Pr-i	Me	MeO	CH ₂ OCH ₂ Ph	Ms	H
	Pr-i	Me	MeO	CHMeOCH ₂ Ph	Ms	H
15	Pr-i	Me	MeO	CH ₂ OCH ₂ CO ₂ Me	Ms	H
	Pr-i	Me	MeO	CH ₂ OCH ₂ CO ₂ Et	Ms	H
	Pr-i	Me	MeO	CH ₂ OCHMeCO ₂ Me	Ms	H
	Pr-i	Me	MeO	CH ₂ CN	Ms	H
	Pr-i	Me	MeO	CHMeCN	Ms	H
20	Pr-i	Me	MeO	CH ₂ SMe	Ms	H
	Pr-i	Me	MeO	CH ₂ SMe	Cl	H
	Pr-i	Me	MeO	CH ₂ SMe	MeS	H
	Pr-i	Me	MeO	CH ₂ SMe	MeSO	H
25	Pr-i	Me	MeO	CH ₂ SEt	Ms	H
	Pr-i	Me	MeO	CH ₂ SEt	Cl	H
	Pr-i	Me	MeO	CH ₂ SEt	MeS	H
	Pr-i	Me	MeO	CH ₂ SEt	MeSO	H
	Pr-i	Me	MeO	CH ₂ SOMe	Ms	H
30	Pr-i	Me	MeO	CH ₂ SOEt	Ms	H
	Pr-i	Me	MeO	CH ₂ SO ₂ Me	Ms	H
	Pr-i	Me	MeO	CH ₂ SO ₂ Me	Cl	H
	Pr-i	Me	MeO	CH ₂ SO ₂ Me	MeS	H
	Pr-i	Me	MeO	CH ₂ SO ₂ Me	MeSO	H
35	Pr-i	Me	MeO	CH ₂ SO ₂ Et	Ms	H
	Pr-i	Me	MeO	CH ₂ SO ₂ Et	Cl	H
	Pr-i	Me	MeO	CH ₂ SO ₂ Et	MeS	H
	Pr-i	Me	MeO	CH ₂ SO ₂ Et	MeSO	H
40	Pr-i	Me	MeO	CHMeSMe	Ms	H
	Pr-i	Me	MeO	CHMeSEt	Ms	H
	Pr-i	Me	MeO	CHMeSO ₂ Me	Ms	H
	Pr-i	Me	MeO	CHMeSO ₂ Et	Ms	H
	Pr-i	Me	MeO	CH ₂ SCH ₂ CH ₂ OMe	Ms	H
45	Pr-i	Me	MeO	CH ₂ OCOMe	Ms	H
	Pr-i	Me	MeO	CH ₂ OCOEt	Ms	H
	Pr-i	Me	MeO	CHMeOCOMe	Ms	H
	Pr-i	Me	MeO	CH ₂ OSO ₂ Me	Ms	H
	Pr-i	Me	MeO	CH ₂ OSO ₂ Et	Ms	H
50	Pr-i	Me	MeO	CHMeOSO ₂ Me	Ms	H

	A	B	X	Y	Z	Q
5	Me	H	Br	CH ₂ OH	Ms	H
	Me	H	Br	CH ₂ OMe	Ms	H
	Me	H	Br	CH ₂ OMe	Cl	H
	Me	H	Br	CH ₂ OMe	MeS	H
10	Me	H	Br	CH ₂ OMe	MeSO	H
	Me	H	Br	CH ₂ OEt	Ms	H
	Me	H	Br	CH ₂ OEt	Cl	H
	Me	H	Br	CH ₂ OEt	MeS	H
	Me	H	Br	CH ₂ OEt	MeSO	H
15	Me	H	Br	CH ₂ OPr-i	Ms	H
	Me	H	Br	CH ₂ OPr-n	Ms	H
	Me	H	Br	CH ₂ OCH=CH ₂	Ms	H
	Me	H	Br	CH ₂ OCH ₂ CH=CH ₂	Ms	H
20	Me	H	Br	CH ₂ OCH ₂ C≡CH	Ms	H
	Me	H	Br	CH ₂ OCH ₂ CH ₂ Cl	Ms	H
	Me	H	Br	CHMeOH	Ms	H
	Me	H	Br	CHMeOMe	Ms	H
	Me	H	Br	CHMeOMe	Cl	H
25	Me	H	Br	CHMeOMe	MeS	H
	Me	H	Br	CHMeOMe	MeSO	H
	Me	H	Br	CHMeOEt	Ms	H
	Me	H	Br	CHMeOCH=CH ₂	Ms	H
	Me	H	Br	CHMeOCH=CH ₂	Ms	H
30	Me	H	Br	CHMeOCH ₂ CH=CH ₂	Ms	H
	Me	H	Br	CHMeOCH ₂ C≡CH	Ms	H
	Me	H	Br	CHMeOCH ₂ CH ₂ Cl	Ms	H
	Me	H	Br	CMe ₂ OH	Ms	H
35	Me	H	Br	CMe ₂ OMe	Ms	H
	Me	H	Br	CMe ₂ OEt	Ms	H
	Me	H	Br	CH ₂ CH ₂ OMe	Ms	H
	Me	H	Br	CH ₂ CH ₂ OEt	Ms	H
	Me	H	Br	CH ₂ OH	Ms	H
40	Me	H	Br	CH ₂ OMe	Ms	H
	Me	H	Br	CH ₂ OEt	Ms	H
	Me	H	Br	CH ₂ OCH ₂ CH ₂ OMe	Ms	H
	Me	H	Br	CHMeOCH ₂ CH ₂ OMe	Ms	H
45	Me	H	Br	CH ₂ NMe ₂	Ms	H
	Me	H	Br	CHMeNMe ₂	Ms	H
	Me	H	Br	CH ₂ CH ₂ NMe ₂	Ms	H
	Me	H	Br	CH ₂ OCH ₂ Ph	Ms	H

50

55

	A	B	X	Y	Z	Q
5	Me	H	Br	CHMeOCH ₂ Ph	Ms	H
	Me	H	Br	CH ₂ OCH ₂ CO ₂ Me	Ms	H
	Me	H	Br	CH ₂ OCH ₂ CO ₂ Et	Ms	H
	Me	H	Br	CH ₂ OCHMeCO ₂ Me	Ms	H
10	Me	H	Br	CH ₂ CN	Ms	H
	Me	H	Br	CH ₂ SMe	Ms	H
	Me	H	Br	CH ₂ SEt	Ms	H
	Me	H	Br	CH ₂ SOMe	Ms	H
15	Me	H	Br	CH ₂ SO ₂ Me	Ms	H
	Me	H	Br	CH ₂ SO ₂ Et	Ms	H
	Me	H	Br	CHMeSMe	Ms	H
	Me	H	Br	CHMeSO ₂ Me	Ms	H
	Me	H	Br	CH ₂ SCH ₂ CH ₂ OMe	Ms	H
20	Me	H	Br	CH ₂ OCOMe	Ms	H
	Me	H	Br	CHMeOCOMe	Ms	H
	Me	H	Br	CH ₂ OSO ₂ Me	Ms	H
	Me	H	Br	CHMeOSO ₂ Me	Ms	H
25	Et	H	Br	CH ₂ OH	Ms	H
	Et	H	Br	CH ₂ OMe	Ms	H
	Et	H	Br	CH ₂ OMe	Cl	H
	Et	H	Br	CH ₂ OMe	MeS	H
	Et	H	Br	CH ₂ OMe	MeSO	H
30	Et	H	Br	CH ₂ OEt	Ms	H
	Et	H	Br	CH ₂ OEt	Cl	H
	Et	H	Br	CH ₂ OEt	MeS	H
	Et	H	Br	CH ₂ OEt	MeSO	H
35	Et	H	Br	CH ₂ OPr-i	Ms	H
	Et	H	Br	CH ₂ OPr-n	Ms	H
	Et	H	Br	CH ₂ OCH=CH ₂	Ms	H
	Et	H	Br	CH ₂ OCH ₂ CH=CH ₂	Ms	H
	Et	H	Br	CH ₂ OCH ₂ C≡CH	Ms	H
40	Et	H	Br	CH ₂ OCH ₂ CH ₂ Cl	Ms	H
	Et	H	Br	CHMeOH	Ms	H
	Et	H	Br	CHMeOMe	Ms	H
	Et	H	Br	CHMeOMe	Cl	H
	Et	H	Br	CHMeOMe	MeS	H
45	Et	H	Br	CHMeOMe	MeSO	H
	Et	H	Br	CHMeOEt	Ms	H
	Et	H	Br	CHMeOCH=CH ₂	Ms	H
	Et	H	Br	CHMeOCH=CH ₂	Ms	H

50

55

	A	B	X	Y	Z	Q
5	Et	H	Br	CHMeOCH ₂ CH=CH ₂	Ms	H
	Et	H	Br	CHMeOCH ₂ C≡CH	Ms	H
	Et	H	Br	CHMeOCH ₂ CH ₂ Cl	Ms	H
	Et	H	Br	CMe ₂ OH	Ms	H
10	Et	H	Br	CMe ₂ OMe	Ms	H
	Et	H	Br	CMe ₂ OEt	Ms	H
	Et	H	Br	CH ₂ CH ₂ OMe	Ms	H
	Et	H	Br	CH ₂ CH ₂ OEt	Ms	H
	Et	H	Br	CHEtOH	Ms	H
15	Et	H	Br	CHEtOMe	Ms	H
	Et	H	Br	CHEtOEt	Ms	H
	Et	H	Br	CH ₂ OCH ₂ CH ₂ OMe	Ms	H
	Et	H	Br	CHMeOCH ₂ CH ₂ OMe	Ms	H
20	Et	H	Br	CH ₂ NMe ₂	Ms	H
	Et	H	Br	CHMeNMe ₂	Ms	H
	Et	H	Br	CH ₂ CH ₂ NMe ₂	Ms	H
	Et	H	Br	CH ₂ OCH ₂ Ph	Ms	H
	Et	H	Br	CHMeOCH ₂ Ph	Ms	H
25	Et	H	Br	CH ₂ OCH ₂ CO ₂ Me	Ms	H
	Et	H	Br	CH ₂ OCH ₂ CO ₂ Et	Ms	H
	Et	H	Br	CH ₂ OCHMeCO ₂ Me	Ms	H
	Et	H	Br	CH ₂ CN	Ms	H
30	Et	H	Br	CH ₂ SMe	Ms	H
	Et	H	Br	CH ₂ SEt	Ms	H
	Et	H	Br	CH ₂ SOMe	Ms	H
	Et	H	Br	CH ₂ SO ₂ Me	Ms	H
	Et	H	Br	CH ₂ SO ₂ Et	Ms	H
35	Et	H	Br	CHMeSMe	Ms	H
	Et	H	Br	CHMeSO ₂ Me	Ms	H
	Et	H	Br	CH ₂ SCH ₂ CH ₂ OMe	Ms	H
	Et	H	Br	CH ₂ OCOMe	Ms	H
40	Et	H	Br	CHMeOCOMe	Ms	H
	Et	H	Br	CH ₂ OSO ₂ Me	Ms	H
	Et	H	Br	CHMeOSO ₂ Me	Ms	H
	Pr-i	H	Br	CH ₂ OH	Ms	H
	Pr-i	H	Br	CH ₂ OMe	Ms	H
45	Pr-i	H	Br	CH ₂ OMe	Cl	H
	Pr-i	H	Br	CH ₂ OMe	MeS	H
	Pr-i	H	Br	CH ₂ OMe	MeSO	H
	Pr-i	H	Br	CH ₂ OEt	Ms	H
50						
55						

	A	B	X	Y	Z	Q
5	Pr-i	H	Br	CH ₂ OEt	Cl	H
	Pr-i	H	Br	CH ₂ OEt	MeS	H
	Pr-i	H	Br	CH ₂ OEt	MeSO	H
	Pr-i	H	Br	CH ₂ OPr-i	Ms	H
10	Pr-i	H	Br	CH ₂ OPr-n	Ms	H
	Pr-i	H	Br	CH ₂ OCH=CH ₂	Ms	H
	Pr-i	H	Br	CH ₂ OCH ₂ CH=CH ₂	Ms	H
	Pr-i	H	Br	CH ₂ OCH ₂ C≡CH	Ms	H
	Pr-i	H	Br	CH ₂ OCH ₂ CH ₂ Cl	Ms	H
15	Pr-i	H	Br	CHMeOH	Ms	H
	Pr-i	H	Br	CHMeOMe	Ms	H
	Pr-i	H	Br	CHMeOMe	Cl	H
	Pr-i	H	Br	CHMeOMe	MeS	H
20	Pr-i	H	Br	CHMeOMe	MeSO	H
	Pr-i	H	Br	CHMeOEt	Ms	H
	Pr-i	H	Br	CHMeOCH=CH ₂	Ms	H
	Pr-i	H	Br	CHMeOCH=CH ₂	Ms	H
	Pr-i	H	Br	CHMeOCH ₂ CH=CH ₂	Ms	H
25	Pr-i	H	Br	CHMeOCH ₂ C≡CH	Ms	H
	Pr-i	H	Br	CHMeOCH ₂ CH ₂ Cl	Ms	H
	Pr-i	H	Br	CMe ₂ OH	Ms	H
	Pr-i	H	Br	CMe ₂ OMe	Ms	H
	Pr-i	H	Br	CMe ₂ OEt	Ms	H
30	Pr-i	H	Br	CH ₂ CH ₂ OMe	Ms	H
	Pr-i	H	Br	CH ₂ CH ₂ OEt	Ms	H
	Pr-i	H	Br	CHEtOH	Ms	H
	Pr-i	H	Br	CHEtOMe	Ms	H
35	Pr-i	H	Br	CHEtOEt	Ms	H
	Pr-i	H	Br	CH ₂ OCH ₂ CH ₂ OMe	Ms	H
	Pr-i	H	Br	CHMeOCH ₂ CH ₂ OMe	Ms	H
	Pr-i	H	Br	CH ₂ NMe ₂	Ms	H
40	Pr-i	H	Br	CHMeNMe ₂	Ms	H
	Pr-i	H	Br	CH ₂ CH ₂ NMe ₂	Ms	H
	Pr-i	H	Br	CH ₂ OCH ₂ Ph	Ms	H
	Pr-i	H	Br	CHMeOCH ₂ Ph	Ms	H
	Pr-i	H	Br	CH ₂ OCH ₂ CO ₂ Me	Ms	H
45	Pr-i	H	Br	CH ₂ OCH ₂ CO ₂ Et	Ms	H
	Pr-i	H	Br	CH ₂ OCHMeCO ₂ Me	Ms	H
	Pr-i	H	Br	CH ₂ CN	Ms	H
	Pr-i	H	Br	CH ₂ SMe	Ms	H

50

55

	A	B	X	Y	Z	Q
5	Pr-i	H	Br	CH ₂ SEt	Ms	H
	Pr-i	H	Br	CH ₂ SOMe	Ms	H
	Pr-i	H	Br	CH ₂ SO ₂ Me	Ms	H
	Pr-i	H	Br	CH ₂ SO ₂ Et	Ms	H
10	Pr-i	H	Br	CHMeSMe	Ms	H
	Pr-i	H	Br	CHMeSO ₂ Me	Ms	H
	Pr-i	H	Br	CH ₂ SCH ₂ CH ₂ OMe	Ms	H
	Pr-i	H	Br	CH ₂ OCOMe	Ms	H
	Pr-i	H	Br	CHMeOCOMe	Ms	H
15	Pr-i	H	Br	CH ₂ OSO ₂ Me	Ms	H
	Pr-i	H	Br	CHMeOSO ₂ Me	Ms	H

20

25

30

35

40

45

50

55

	A	B	X	Y	Z	Q
5	Me	H	I	CH ₂ OH	Ms	H
	Me	H	I	CH ₂ OMe	Ms	H
	Me	H	I	CH ₂ OMe	Cl	H
10	Me	H	I	CH ₂ OMe	MeS	H
	Me	H	I	CH ₂ OMe	MeSO	H
	Me	H	I	CH ₂ OE t	Ms	H
	Me	H	I	CH ₂ OE t	Cl	H
	Me	H	I	CH ₂ OE t	MeS	H
15	Me	H	I	CH ₂ OE t	MeSO	H
	Me	H	I	CH ₂ OPr-i	Ms	H
	Me	H	I	CH ₂ OPr-n	Ms	H
	Me	H	I	CH ₂ OCH=CH ₂	Ms	H
20	Me	H	I	CH ₂ OCH ₂ CH=CH ₂	Ms	H
	Me	H	I	CH ₂ OCH ₂ C≡CH	Ms	H
	Me	H	I	CH ₂ OCH ₂ CH ₂ Cl	Ms	H
	Me	H	I	CHMeOH	Ms	H
	Me	H	I	CHMeOMe	Ms	H
25	Me	H	I	CHMeOMe	Cl	H
	Me	H	I	CHMeOMe	MeS	H
	Me	H	I	CHMeOMe	MeSO	H
	Me	H	I	CHMeOE t	Ms	H
	Me	H	I	CHMeOCH=CH ₂	Ms	H
30	Me	H	I	CHMeOCH=CH ₂	Ms	H
	Me	H	I	CHMeOCH ₂ CH=CH ₂	Ms	H
	Me	H	I	CHMeOCH ₂ C≡CH	Ms	H
	Me	H	I	CHMeOCH ₂ CH ₂ Cl	Ms	H
35	Me	H	I	CMe ₂ OH	Ms	H
	Me	H	I	CMe ₂ OMe	Ms	H
	Me	H	I	CMe ₂ OE t	Ms	H
	Me	H	I	CH ₂ CH ₂ OMe	Ms	H
	Me	H	I	CH ₂ CH ₂ OE t	Ms	H
40	Me	H	I	CHEtOH	Ms	H
	Me	H	I	CHEtOMe	Ms	H
	Me	H	I	CHEtOE t	Ms	H
	Me	H	I	CH ₂ OCH ₂ CH ₂ OMe	Ms	H
	Me	H	I	CHMeOCH ₂ CH ₂ OMe	Ms	H
45	Me	H	I	CH ₂ NMe ₂	Ms	H
	Me	H	I	CHMeNMe ₂	Ms	H
	Me	H	I	CH ₂ CH ₂ NMe ₂	Ms	H
	Me	H	I	CH ₂ OCH ₂ Ph	Ms	H

50

55

	A	B	X	Y	Z	Q
5	Me	H	I	CHMeOCH ₂ Ph	Ms	H
	Me	H	I	CH ₂ OCH ₂ CO ₂ Me	Ms	H
	Me	H	I	CH ₂ OCH ₂ CO ₂ Et	Ms	H
	Me	H	I	CH ₂ OCHMeCO ₂ Me	Ms	H
10	Me	H	I	CH ₂ CN	Ms	H
	Me	H	I	CH ₂ SMe	Ms	H
	Me	H	I	CH ₂ SEt	Ms	H
	Me	H	I	CH ₂ SOMe	Ms	H
	Me	H	I	CH ₂ SO ₂ Me	Ms	H
15	Me	H	I	CH ₂ SO ₂ Et	Ms	H
	Me	H	I	CHMeSMe	Ms	H
	Me	H	I	CHMeSO ₂ Me	Ms	H
	Me	H	I	CH ₂ SCH ₂ CH ₂ OMe	Ms	H
20	Me	H	I	CH ₂ OCOMe	Ms	H
	Me	H	I	CHMeOCOMe	Ms	H
	Me	H	I	CH ₂ OSO ₂ Me	Ms	H
	Me	H	I	CHMeOSO ₂ Me	Ms	H
	Et	H	I	CH ₂ OH	Ms	H
25	Et	H	I	CH ₂ OMe	Ms	H
	Et	H	I	CH ₂ OMe	Cl	H
	Et	H	I	CH ₂ OMe	MeS	H
	Et	H	I	CH ₂ OMe	MeSO	H
	Et	H	I	CH ₂ OEt	Ms	H
30	Et	H	I	CH ₂ OEt	Cl	H
	Et	H	I	CH ₂ OEt	MeS	H
	Et	H	I	CH ₂ OEt	MeSO	H
	Et	H	I	CH ₂ OPr-i	Ms	H
35	Et	H	I	CH ₂ OPr-n	Ms	H
	Et	H	I	CH ₂ OCH=CH ₂	Ms	H
	Et	H	I	CH ₂ OCH ₂ CH=CH ₂	Ms	H
	Et	H	I	CH ₂ OCH ₂ C≡CH	Ms	H
	Et	H	I	CH ₂ OCH ₂ CH ₂ Cl	Ms	H
40	Et	H	I	CHMeOH	Ms	H
	Et	H	I	CHMeOMe	Ms	H
	Et	H	I	CHMeOMe	Cl	H
	Et	H	I	CHMeOMe	MeS	H
45	Et	H	I	CHMeOMe	MeSO	H
	Et	H	I	CHMeOEt	Ms	H
	Et	H	I	CHMeOCH=CH ₂	Ms	H
	Et	H	I	CHMeOCH=CH ₂	Ms	H

50

55

	A	B	X	Y	Z	Q
5	Et	H	I	CHMeOCH ₂ CH=CH ₂	Ms	H
	Et	H	I	CHMeOCH ₂ C≡CH	Ms	H
	Et	H	I	CHMeOCH ₂ CH ₂ Cl	Ms	H
	Et	H	I	CMe ₂ OH	Ms	H
10	Et	H	I	CMe ₂ OMe	Ms	H
	Et	H	I	CMe ₂ OEt	Ms	H
	Et	H	I	CH ₂ CH ₂ OMe	Ms	H
	Et	H	I	CH ₂ CH ₂ OEt	Ms	H
15	Et	H	I	CHEtOH	Ms	H
	Et	H	I	CHEtOMe	Ms	H
	Et	H	I	CHEtOEt	Ms	H
	Et	H	I	CH ₂ OCH ₂ CH ₂ OMe	Ms	H
	Et	H	I	CHMeOCH ₂ CH ₂ OMe	Ms	H
20	Et	H	I	CH ₂ NMe ₂	Ms	H
	Et	H	I	CHMeNMe ₂	Ms	H
	Et	H	I	CH ₂ CH ₂ NMe ₂	Ms	H
	Et	H	I	CH ₂ OCH ₂ Ph	Ms	H
25	Et	H	I	CHMeOCH ₂ Ph	Ms	H
	Et	H	I	CH ₂ OCH ₂ CO ₂ Me	Ms	H
	Et	H	I	CH ₂ OCH ₂ CO ₂ Et	Ms	H
	Et	H	I	CH ₂ OCHMeCO ₂ Me	Ms	H
	Et	H	I	CH ₂ CN	Ms	H
30	Et	H	I	CH ₂ SMe	Ms	H
	Et	H	I	CH ₂ SEt	Ms	H
	Et	H	I	CH ₂ SOMe	Ms	H
	Et	H	I	CH ₂ SO ₂ Me	Ms	H
	Et	H	I	CH ₂ SO ₂ Et	Ms	H
35	Et	H	I	CHMeSMe	Ms	H
	Et	H	I	CHMeSO ₂ Me	Ms	H
	Et	H	I	CH ₂ SCH ₂ CH ₂ OMe	Ms	H
	Et	H	I	CH ₂ OCOMe	Ms	H
40	Et	H	I	CHMeOCOMe	Ms	H
	Et	H	I	CH ₂ OSO ₂ Me	Ms	H
	Et	H	I	CHMeOSO ₂ Me	Ms	H
	Pr-i	H	I	CH ₂ OH	Ms	H
	Pr-i	H	I	CH ₂ OMe	Ms	H
45	Pr-i	H	I	CH ₂ OMe	Cl	H
	Pr-i	H	I	CH ₂ OMe	MeS	H
	Pr-i	H	I	CH ₂ OMe	MeSO	H
	Pr-i	H	I	CH ₂ OEt	Ms	H

50

55

	A	B	X	Y	Z	Q
5	Pr-i	H	I	CH ₂ OEt	Cl	H
	Pr-i	H	I	CH ₂ OEt	MeS	H
	Pr-i	H	I	CH ₂ OEt	MeSO	H
	Pr-i	H	I	CH ₂ OPr-i	Ms	H
10	Pr-i	H	I	CH ₂ OPr-n	Ms	H
	Pr-i	H	I	CH ₂ OCH=CH ₂	Ms	H
	Pr-i	H	I	CH ₂ OCH ₂ CH=CH ₂	Ms	H
	Pr-i	H	I	CH ₂ OCH ₂ C≡CH	Ms	H
	Pr-i	H	I	CH ₂ OCH ₂ CH ₂ Cl	Ms	H
15	Pr-i	H	I	CHMeOH	Ms	H
	Pr-i	H	I	CHMeOMe	Ms	H
	Pr-i	H	I	CHMeOMe	Cl	H
	Pr-i	H	I	CHMeOMe	MeS	H
20	Pr-i	H	I	CHMeOMe	MeSO	H
	Pr-i	H	I	CHMeOEt	Ms	H
	Pr-i	H	I	CHMeOCH=CH ₂	Ms	H
	Pr-i	H	I	CHMeOCH=CH ₂	Ms	H
	Pr-i	H	I	CHMeOCH ₂ CH=CH ₂	Ms	H
25	Pr-i	H	I	CHMeOCH ₂ C≡CH	Ms	H
	Pr-i	H	I	CHMeOCH ₂ CH ₂ Cl	Ms	H
	Pr-i	H	I	CMe ₂ OH	Ms	H
	Pr-i	H	I	CMe ₂ OMe	Ms	H
30	Pr-i	H	I	CMe ₂ OEt	Ms	H
	Pr-i	H	I	CH ₂ CH ₂ OMe	Ms	H
	Pr-i	H	I	CH ₂ CH ₂ OEt	Ms	H
	Pr-i	H	I	CH ₂ OH	Ms	H
	Pr-i	H	I	CH ₂ OMe	Ms	H
35	Pr-i	H	I	CH ₂ OEt	Ms	H
	Pr-i	H	I	CH ₂ OCH ₂ CH ₂ OMe	Ms	H
	Pr-i	H	I	CHMeOCH ₂ CH ₂ OMe	Ms	H
	Pr-i	H	I	CH ₂ NMe ₂	Ms	H
40	Pr-i	H	I	CHMeNMe ₂	Ms	H
	Pr-i	H	I	CH ₂ CH ₂ NMe ₂	Ms	H
	Pr-i	H	I	CH ₂ OCH ₂ Ph	Ms	H
	Pr-i	H	I	CHMeOCH ₂ Ph	Ms	H
	Pr-i	H	I	CH ₂ OCH ₂ CO ₂ Me	Ms	H
45	Pr-i	H	I	CH ₂ OCH ₂ CO ₂ Et	Ms	H
	Pr-i	H	I	CH ₂ OCHMeCO ₂ Me	Ms	H
	Pr-i	H	I	CH ₂ CN	Ms	H
	Pr-i	H	I	CH ₂ SMe	Ms	H

50

55

	A	B	X	Y	Z	Q
5	Pr-i	H	I	CH ₂ SEt	Ms	H
	Pr-i	H	I	CH ₂ SOMe	Ms	H
	Pr-i	H	I	CH ₂ SO ₂ Me	Ms	H
	Pr-i	H	I	CH ₂ SO ₂ Et	Ms	H
	Pr-i	H	I	CHMeSMe	Ms	H
10	Pr-i	H	I	CHMeSO ₂ Me	Ms	H
	Pr-i	H	I	CH ₂ SCH ₂ CH ₂ OMe	Ms	H
	Pr-i	H	I	CH ₂ OCOMe	Ms	H
	Pr-i	H	I	CHMeOCOMe	Ms	H
15	Pr-i	H	I	CH ₂ OSO ₂ Me	Ms	H
	Pr-i	H	I	CHMeOSO ₂ Me	Ms	H

20

25

30

35

40

45

50

55

	A	E	X	Y	Z	Q
5	Me	H	Et	CH ₂ OH	Ms	H
	Me	H	Et	CH ₂ OMe	Ms	H
	Me	H	Et	CH ₂ OMe	Cl	H
	Me	H	Et	CH ₂ OMe	MeS	H
10	Me	H	Et	CH ₂ OMe	MeSO	H
	Me	H	Et	CH ₂ OEt	Ms	H
	Me	H	Et	CH ₂ OEt	Cl	H
	Me	H	Et	CH ₂ OEt	MeS	H
	Me	H	Et	CH ₂ OEt	MeSO	H
15	Me	H	Et	CH ₂ OPr-i	Ms	H
	Me	H	Et	CH ₂ OPr-n	Ms	H
	Me	H	Et	CH ₂ OCH=CH ₂	Ms	H
	Me	H	Et	CH ₂ OCH ₂ CH=CH ₂	Ms	H
20	Me	H	Et	CH ₂ OCH ₂ C≡CH	Ms	H
	Me	H	Et	CH ₂ OCH ₂ CH ₂ Cl	Ms	H
	Me	H	Et	CHMeOH	Ms	H
	Me	H	Et	CHMeOMe	Ms	H
	Me	H	Et	CHMeOMe	Cl	H
25	Me	H	Et	CHMeOMe	MeS	H
	Me	H	Et	CHMeOMe	MeSO	H
	Me	H	Et	CHMeOEt	Ms	H
	Me	H	Et	CHMeOCH=CH ₂	Ms	H
	Me	H	Et	CHMeOCH=CH ₂	Ms	H
30	Me	H	Et	CHMeOCH ₂ CH=CH ₂	Ms	H
	Me	H	Et	CHMeOCH ₂ C≡CH	Ms	H
	Me	H	Et	CHMeOCH ₂ CH ₂ Cl	Ms	H
	Me	H	Et	CMe ₂ OH	Ms	H
35	Me	H	Et	CMe ₂ OMe	Ms	H
	Me	H	Et	CMe ₂ OEt	Ms	H
	Me	H	Et	CH ₂ CH ₂ OMe	Ms	H
	Me	H	Et	CH ₂ CH ₂ OEt	Ms	H
	Me	H	Et	CHEtOH	Ms	H
40	Me	H	Et	CHEtOMe	Ms	H
	Me	H	Et	CHEtOEt	Ms	H
	Me	H	Et	CH ₂ OCH ₂ CH ₂ OMe	Ms	H
	Me	H	Et	CHMeOCH ₂ CH ₂ OMe	Ms	H
45	Me	H	Et	CH ₂ NMe ₂	Ms	H
	Me	H	Et	CHMeNMe ₂	Ms	H
	Me	H	Et	CH ₂ CH ₂ NMe ₂	Ms	H
	Me	H	Et	CH ₂ OCH ₂ Ph	Ms	H

50

55

	A	B	X	Y	Z	Q
5	Me	H	Et	CHMeOCH ₂ Ph	Ms	H
	Me	H	Et	CH ₂ OCH ₂ CO ₂ Me	Ms	H
	Me	H	Et	CH ₂ OCH ₂ CO ₂ Et	Ms	H
	Me	H	Et	CH ₂ OCHMeCO ₂ Me	Ms	H
10	Me	H	Et	CH ₂ CN	Ms	H
	Me	H	Et	CH ₂ SMe	Ms	H
	Me	H	Et	CH ₂ SEt	Ms	H
	Me	H	Et	CH ₂ SOMe	Ms	H
15	Me	H	Et	CH ₂ SO ₂ Me	Ms	H
	Me	H	Et	CH ₂ SO ₂ Et	Ms	H
	Me	H	Et	CHMeSMe	Ms	H
	Me	H	Et	CHMeSO ₂ Me	Ms	H
	Me	H	Et	CH ₂ SCH ₂ CH ₂ OMe	Ms	H
20	Me	H	Et	CH ₂ OCOMe	Ms	H
	Me	H	Et	CHMeOCOMe	Ms	H
	Me	H	Et	CH ₂ OSO ₂ Me	Ms	H
	Me	H	Et	CHMeOSO ₂ Me	Ms	H
25	Et	H	Et	CH ₂ OH	Ms	H
	Et	H	Et	CH ₂ OMe	Ms	H
	Et	H	Et	CH ₂ OMe	Cl	H
	Et	H	Et	CH ₂ OMe	MeS	H
	Et	H	Et	CH ₂ OMe	MeSO	H
30	Et	H	Et	CH ₂ OEt	Ms	H
	Et	H	Et	CH ₂ OEt	Cl	H
	Et	H	Et	CH ₂ OEt	MeS	H
	Et	H	Et	CH ₂ OEt	MeSO	H
35	Et	H	Et	CH ₂ OPr-i	Ms	H
	Et	H	Et	CH ₂ OPr-n	Ms	H
	Et	H	Et	CH ₂ OCH=CH ₂	Ms	H
	Et	H	Et	CH ₂ OCH ₂ CH=CH ₂	Ms	H
	Et	H	Et	CH ₂ OCH ₂ C≡CH	Ms	H
40	Et	H	Et	CH ₂ OCH ₂ CH ₂ Cl	Ms	H
	Et	H	Et	CHMeOH	Ms	H
	Et	H	Et	CHMeOMe	Ms	H
	Et	H	Et	CHMeOMe	Cl	H
	Et	H	Et	CHMeOMe	MeS	H
45	Et	H	Et	CHMeOMe	MeSO	H
	Et	H	Et	CHMeOEt	Ms	H
	Et	H	Et	CHMeOCH=CH ₂	Ms	H
	Et	H	Et	CHMeOCH=CH ₂	Ms	H

50

55

	A	B	X	Y	Z	Q
5	Et	H	Et	CHMeOCH ₂ CH=CH ₂	Ms	H
	Et	H	Et	CHMeOCH ₂ C≡CH	Ms	H
	Et	H	Et	CHMeOCH ₂ CH ₂ Cl	Ms	H
	Et	H	Et	CMe ₂ OH	Ms	H
10	Et	H	Et	CMe ₂ OMe	Ms	H
	Et	H	Et	CMe ₂ OEt	Ms	H
	Et	H	Et	CH ₂ CH ₂ OMe	Ms	H
	Et	H	Et	CH ₂ CH ₂ OEt	Ms	H
15	Et	H	Et	CHEtOH	Ms	H
	Et	H	Et	CHEtOMe	Ms	H
	Et	H	Et	CHEtOEt	Ms	H
	Et	H	Et	CH ₂ OCH ₂ CH ₂ OMe	Ms	H
	Et	H	Et	CHMeOCH ₂ CH ₂ OMe	Ms	H
20	Et	H	Et	CH ₂ NMe ₂	Ms	H
	Et	H	Et	CHMeNMe ₂	Ms	H
	Et	H	Et	CH ₂ CH ₂ NMe ₂	Ms	H
	Et	H	Et	CH ₂ OCH ₂ Ph	Ms	H
	Et	H	Et	CHMeOCH ₂ Ph	Ms	H
25	Et	H	Et	CH ₂ OCH ₂ CO ₂ Me	Ms	H
	Et	H	Et	CH ₂ OCH ₂ CO ₂ Et	Ms	H
	Et	H	Et	CH ₂ OCHMeCO ₂ Me	Ms	H
	Et	H	Et	CH ₂ CN	Ms	H
30	Et	H	Et	CH ₂ SMe	Ms	H
	Et	H	Et	CH ₂ SEt	Ms	H
	Et	H	Et	CH ₂ SOMe	Ms	H
	Et	H	Et	CH ₂ SO ₂ Me	Ms	H
	Et	H	Et	CH ₂ SO ₂ Et	Ms	H
35	Et	H	Et	CHMeSMe	Ms	H
	Et	H	Et	CHMeSO ₂ Me	Ms	H
	Et	H	Et	CH ₂ SCH ₂ CH ₂ OMe	Ms	H
	Et	H	Et	CH ₂ OCOMe	Ms	H
40	Et	H	Et	CHMeOCOMe	Ms	H
	Et	H	Et	CH ₂ OSO ₂ Me	Ms	H
	Et	H	Et	CHMeOSO ₂ Me	Ms	H
	Pr-i	H	Et	CH ₂ OH	Ms	H
	Pr-i	H	Et	CH ₂ OMe	Ms	H
45	Pr-i	H	Et	CH ₂ OMe	Cl	H
	Pr-i	H	Et	CH ₂ OMe	MeS	H
	Pr-i	H	Et	CH ₂ OMe	MeSO	H
	Pr-i	H	Et	CH ₂ OEt	Ms	H
50						
55						

	A	B	X	Y	Z	Q
5	Pr-i	H	Et	CH ₂ OEt	Cl	H
	Pr-i	H	Et	CH ₂ OEt	MeS	H
	Pr-i	H	Et	CH ₂ OEt	MeSO	H
	Pr-i	H	Et	CH ₂ OPr-i	Ms	H
10	Pr-i	H	Et	CH ₂ OPr-n	Ms	H
	Pr-i	H	Et	CH ₂ OCH=CH ₂	Ms	H
	Pr-i	H	Et	CH ₂ OCH ₂ CH=CH ₂	Ms	H
	Pr-i	H	Et	CH ₂ OCH ₂ C≡CH	Ms	H
15	Pr-i	H	Et	CH ₂ OCH ₂ CH ₂ Cl	Ms	H
	Pr-i	H	Et	CHMeOH	Ms	H
	Pr-i	H	Et	CHMeOMe	Ms	H
	Pr-i	H	Et	CHMeOMe	Cl	H
	Pr-i	H	Et	CHMeOMe	MeS	H
20	Pr-i	H	Et	CHMeOMe	MeSO	H
	Pr-i	H	Et	CHMeOEt	Ms	H
	Pr-i	H	Et	CHMeOCH=CH ₂	Ms	H
	Pr-i	H	Et	CHMeOCH=CH ₂	Ms	H
	Pr-i	H	Et	CHMeOCH ₂ CH=CH ₂	Ms	H
25	Pr-i	H	Et	CHMeOCH ₂ C≡CH	Ms	H
	Pr-i	H	Et	CHMeOCH ₂ CH ₂ Cl	Ms	H
	Pr-i	H	Et	CMe ₂ OH	Ms	H
	Pr-i	H	Et	CMe ₂ OMe	Ms	H
30	Pr-i	H	Et	CMe ₂ OEt	Ms	H
	Pr-i	H	Et	CH ₂ CH ₂ OMe	Ms	H
	Pr-i	H	Et	CH ₂ CH ₂ OEt	Ms	H
	Pr-i	H	Et	CHEtOH	Ms	H
	Pr-i	H	Et	CHEtOMe	Ms	H
35	Pr-i	H	Et	CHEtOEt	Ms	H
	Pr-i	H	Et	CH ₂ OCH ₂ CH ₂ OMe	Ms	H
	Pr-i	H	Et	CHMeOCH ₂ CH ₂ OMe	Ms	H
	Pr-i	H	Et	CH ₂ NMe ₂	Ms	H
40	Pr-i	H	Et	CHMeNMe ₂	Ms	H
	Pr-i	H	Et	CH ₂ CH ₂ NMe ₂	Ms	H
	Pr-i	H	Et	CH ₂ OCH ₂ Ph	Ms	H
	Pr-i	H	Et	CHMeOCH ₂ Ph	Ms	H
	Pr-i	H	Et	CH ₂ OCH ₂ CO ₂ Me	Ms	H
45	Pr-i	H	Et	CH ₂ OCH ₂ CO ₂ Et	Ms	H
	Pr-i	H	Et	CH ₂ OCHMeCO ₂ Me	Ms	H
	Pr-i	H	Et	CH ₂ CN	Ms	H
	Pr-i	H	Et	CH ₂ SMe	Ms	H

50

55

	A	E	X	Y	Z	Q
5	Pr-i	H	Et	CH ₂ SEt	Ms	H
	Pr-i	H	Et	CH ₂ SOMe	Ms	H
	Pr-i	H	Et	CH ₂ SO ₂ Me	Ms	H
	Pr-i	H	Et	CH ₂ SO ₂ Et	Ms	H
	Pr-i	H	Et	CHMeSMe	Ms	H
10	Pr-i	H	Et	CHMeSO ₂ Me	Ms	H
	Pr-i	H	Et	CH ₂ SCH ₂ CH ₂ OMe	Ms	H
	Pr-i	H	Et	CH ₂ OCOMe	Ms	H
	Pr-i	H	Et	CHMeOCOMe	Ms	H
15	Pr-i	H	Et	CH ₂ OSO ₂ Me	Ms	H
	Pr-i	H	Et	CHMeOSO ₂ Me	Ms	H

20

25

30

35

40

45

50

55

	A	E	X	Y	Z	Q
5	Me	Me	Br	CH ₂ OH	Ms	H
	Me	Me	Br	CH ₂ OMe	Ms	H
	Me	Me	Br	CH ₂ OMe	Cl	H
	Me	Me	Br	CH ₂ OMe	MeS	H
10	Me	Me	Br	CH ₂ OMe	MeSO	H
	Me	Me	Br	CH ₂ OE t	Ms	H
	Me	Me	Br	CH ₂ OE t	Cl	H
	Me	Me	Br	CH ₂ OE t	MeS	H
15	Me	Me	Br	CH ₂ OE t	MeSO	H
	Me	Me	Br	CH ₂ OPr-i	Ms	H
	Me	Me	Br	CH ₂ OPr-n	Ms	H
	Me	Me	Br	CH ₂ OCH=CH ₂	Ms	H
20	Me	Me	Br	CH ₂ OCH ₂ CH=CH ₂	Ms	H
	Me	Me	Br	CH ₂ OCH ₂ C≡CH	Ms	H
	Me	Me	Br	CH ₂ OCH ₂ CH ₂ Cl	Ms	H
	Me	Me	Br	CHMeOH	Ms	H
	Me	Me	Br	CHMeOMe	Ms	H
25	Me	Me	Br	CHMeOMe	Cl	H
	Me	Me	Br	CHMeOMe	MeS	H
	Me	Me	Br	CHMeOMe	MeSO	H
	Me	Me	Br	CHMeOE t	Ms	H
	Me	Me	Br	CH ₂ CH ₂ OMe	Ms	H
30	Me	Me	Br	CH ₂ CH ₂ OE t	Ms	H
	Me	Me	Br	CHEtOH	Ms	H
	Me	Me	Br	CHEtOMe	Ms	H
	Me	Me	Br	CHEtOE t	Ms	H
	Me	Me	Br	CH ₂ OCH ₂ CH ₂ OMe	Ms	H
35	Me	Me	Br	CH ₂ NMe ₂	Ms	H
	Me	Me	Br	CH ₂ OCH ₂ Ph	Ms	H
	Me	Me	Br	CH ₂ OCH ₂ CO ₂ Me	Ms	H
	Me	Me	Br	CH ₂ OCH ₂ CO ₂ Et	Ms	H
40	Me	Me	Br	CH ₂ OCHMeCO ₂ Me	Ms	H
	Me	Me	Br	CH ₂ CN	Ms	H
	Me	Me	Br	CH ₂ SMe	Ms	H
	Me	Me	Br	CH ₂ SE t	Ms	H
	Me	Me	Br	CH ₂ SO ₂ Me	Ms	H
45	Me	Me	Br	CH ₂ SO ₂ Et	Ms	H
	Me	Me	Br	CH ₂ SCH ₂ CH ₂ OMe	Ms	H
	Me	Me	Br	CH ₂ OCOMe	Ms	H
	Me	Me	Br	CHMeOCOMe	Ms	H

50

55

	A	B	X	Y	Z	Q
5	Me	Me	Br	CH ₂ OSO ₂ Me	Ms	H
	Me	Me	Br	CHMeOSO ₂ Me	Ms	H
	Et	Me	Br	CH ₂ OH	Ms	H
10	Et	Me	Br	CH ₂ OMe	Ms	H
	Et	Me	Br	CH ₂ OMe	Cl	H
	Et	Me	Br	CH ₂ OMe	MeS	H
	Et	Me	Br	CH ₂ OMe	MeSO	H
	Et	Me	Br	CH ₂ OEt	Ms	H
15	Et	Me	Br	CH ₂ OEt	Cl	H
	Et	Me	Br	CH ₂ OEt	MeS	H
	Et	Me	Br	CH ₂ OEt	MeSO	H
	Et	Me	Br	CH ₂ OPr-i	Ms	H
	Et	Me	Br	CH ₂ OPr-n	Ms	H
20	Et	Me	Br	CH ₂ OCH=CH ₂	Ms	H
	Et	Me	Br	CH ₂ OCH ₂ CH=CH ₂	Ms	H
	Et	Me	Br	CH ₂ OCH ₂ C≡CH	Ms	H
	Et	Me	Br	CH ₂ OCH ₂ CH ₂ Cl	Ms	H
25	Et	Me	Br	CHMeOH	Ms	H
	Et	Me	Br	CHMeOMe	Ms	H
	Et	Me	Br	CHMeOMe	Cl	H
	Et	Me	Br	CHMeOMe	MeS	H
	Et	Me	Br	CHMeOMe	MeSO	H
30	Et	Me	Br	CHMeOEt	Ms	H
	Et	Me	Br	CH ₂ CH ₂ OMe	Ms	H
	Et	Me	Br	CH ₂ CH ₂ OEt	Ms	H
	Et	Me	Br	CHEtOH	Ms	H
35	Et	Me	Br	CHEtOMe	Ms	H
	Et	Me	Br	CHEtOEt	Ms	H
	Et	Me	Br	CH ₂ OCH ₂ CH ₂ OMe	Ms	H
	Et	Me	Br	CH ₂ NMe ₂	Ms	H
	Et	Me	Br	CH ₂ OCH ₂ Ph	Ms	H
40	Et	Me	Br	CH ₂ OCH ₂ CO ₂ Me	Ms	H
	Et	Me	Br	CH ₂ OCH ₂ CO ₂ Et	Ms	H
	Et	Me	Br	CH ₂ OCHMeCO ₂ Me	Ms	H
	Et	Me	Br	CH ₂ CN	Ms	H
45	Et	Me	Br	CH ₂ SMe	Ms	H
	Et	Me	Br	CH ₂ SEt	Ms	H
	Et	Me	Br	CH ₂ SO ₂ Me	Ms	H
	Et	Me	Br	CH ₂ SO ₂ Et	Ms	H
	Et	Me	Br	CH ₂ SCH ₂ CH ₂ OMe	Ms	H
50						
55						

	A	B	X	Y	Z	Q
5	Et	Me	Br	CH ₂ OCOMe	Ms	H
	Et	Me	Br	CHMeOCOMe	Ms	H
	Et	Me	Br	CH ₂ OSO ₂ Me	Ms	H
10	Et	Me	Br	CHMeOSO ₂ Me	Ms	H
	Pr-i	Me	Br	CH ₂ OH	Ms	H
	Pr-i	Me	Br	CH ₂ OMe	Ms	H
	Pr-i	Me	Br	CH ₂ OMe	Cl	H
	Pr-i	Me	Br	CH ₂ OMe	MeS	H
15	Pr-i	Me	Br	CH ₂ OMe	MeSO	H
	Pr-i	Me	Br	CH ₂ OEt	Ms	H
	Pr-i	Me	Br	CH ₂ OEt	Cl	H
	Pr-i	Me	Br	CH ₂ OEt	MeS	H
20	Pr-i	Me	Br	CH ₂ OEt	MeSO	H
	Pr-i	Me	Br	CH ₂ OPr-i	Ms	H
	Pr-i	Me	Br	CH ₂ OPr-a	Ms	H
	Pr-i	Me	Br	CH ₂ OCH=CH ₂	Ms	H
	Pr-i	Me	Br	CH ₂ OCH ₂ CH=CH ₂	Ms	H
25	Pr-i	Me	Br	CH ₂ OCH ₂ C≡CH	Ms	H
	Pr-i	Me	Br	CH ₂ OCH ₂ CH ₂ Cl	Ms	H
	Pr-i	Me	Br	CHMeOH	Ms	H
	Pr-i	Me	Br	CHMeOMe	Ms	H
	Pr-i	Me	Br	CHMeOMe	Cl	H
30	Pr-i	Me	Br	CHMeOMe	MeS	H
	Pr-i	Me	Br	CHMeOMe	MeSO	H
	Pr-i	Me	Br	CHMeOEt	Ms	H
	Pr-i	Me	Br	CH ₂ CH ₂ OMe	Ms	H
35	Pr-i	Me	Br	CH ₂ CH ₂ OEt	Ms	H
	Pr-i	Me	Br	CHEtOH	Ms	H
	Pr-i	Me	Br	CHEtOMe	Ms	H
	Pr-i	Me	Br	CHEtOEt	Ms	H
	Pr-i	Me	Br	CH ₂ OCH ₂ CH ₂ OMe	Ms	H
40	Pr-i	Me	Br	CH ₂ NMe ₂	Ms	H
	Pr-i	Me	Br	CH ₂ OCH ₂ Ph	Ms	H
	Pr-i	Me	Br	CH ₂ OCH ₂ CO ₂ Me	Ms	H
	Pr-i	Me	Br	CH ₂ OCH ₂ CO ₂ Et	Ms	H
	Pr-i	Me	Br	CH ₂ OCHMeCO ₂ Me	Ms	H
45	Pr-i	Me	Br	CH ₂ CN	Ms	H
	Pr-i	Me	Br	CH ₂ SMe	Ms	H
	Pr-i	Me	Br	CH ₂ SEt	Ms	H
	Pr-i	Me	Br	CH ₂ SO ₂ Me	Ms	H

50

55

	A	B	X	Y	Z	Q
5	Pr-i	Me	Br	CH ₂ SO ₂ Et	Ms	H
	Pr-i	Me	Br	CH ₂ SCH ₂ CH ₂ OMe	Ms	H
	Pr-i	Me	Br	CH ₂ OCOMe	Ms	H
	Pr-i	Me	Br	CHMeOCOMe	Ms	H
	Pr-i	Me	Br	CH ₂ OSO ₂ Me	Ms	H
10	Pr-i	Me	Br	CHMeOSO ₂ Me	Ms	H

15

20

25

30

35

40

45

50

55

	A	B	X	Y	Z	Q
5	Me	Me	I	CH ₂ OH	Ms	H
	Me	Me	I	CH ₂ OMe	Ms	H
	Me	Me	I	CH ₂ OMe	Cl	H
10	Me	Me	I	CH ₂ OMe	MeS	H
	Me	Me	I	CH ₂ OMe	MeSO	H
	Me	Me	I	CH ₂ OEt	Ms	H
	Me	Me	I	CH ₂ OEt	Cl	H
	Me	Me	I	CH ₂ OEt	MeS	H
15	Me	Me	I	CH ₂ OEt	MeSO	H
	Me	Me	I	CH ₂ OPr-i	Ms	H
	Me	Me	I	CH ₂ OPr-n	Ms	H
	Me	Me	I	CH ₂ OCH=CH ₂	Ms	H
20	Me	Me	I	CH ₂ OCH ₂ CH=CH ₂	Ms	H
	Me	Me	I	CH ₂ OCH ₂ C≡CH	Ms	H
	Me	Me	I	CH ₂ OCH ₂ CH ₂ Cl	Ms	H
	Me	Me	I	CHMeOH	Ms	H
	Me	Me	I	CHMeOMe	Ms	H
25	Me	Me	I	CHMeOMe	Cl	H
	Me	Me	I	CHMeOMe	MeS	H
	Me	Me	I	CHMeOMe	MeSO	H
	Me	Me	I	CHMeOEt	Ms	H
30	Me	Me	I	CH ₂ CH ₂ OMe	Ms	H
	Me	Me	I	CH ₂ CH ₂ OEt	Ms	H
	Me	Me	I	CHEtOH	Ms	H
	Me	Me	I	CHEtOMe	Ms	H
	Me	Me	I	CHEtOEt	Ms	H
35	Me	Me	I	CH ₂ OCH ₂ CH ₂ OMe	Ms	H
	Me	Me	I	CH ₂ NMe ₂	Ms	H
	Me	Me	I	CH ₂ OCH ₂ Ph	Ms	H
	Me	Me	I	CH ₂ OCH ₂ CO ₂ Me	Ms	H
40	Me	Me	I	CH ₂ OCH ₂ CO ₂ Et	Ms	H
	Me	Me	I	CH ₂ OCHMeCO ₂ Me	Ms	H
	Me	Me	I	CH ₂ CN	Ms	H
	Me	Me	I	CH ₂ SMe	Ms	H
	Me	Me	I	CH ₂ SEt	Ms	H
45	Me	Me	I	CH ₂ SO ₂ Me	Ms	H
	Me	Me	I	CH ₂ SO ₂ Et	Ms	H
	Me	Me	I	CH ₂ SCH ₂ CH ₂ OMe	Ms	H
	Me	Me	I	CH ₂ OCOMe	Ms	H
	Me	Me	I	CHMeOCOMe	Ms	H

50

55

	A	B	X	Y	Z	Q
5	Me	Me	I	CH ₂ OSO ₂ Me	Ms	H
	Me	Me	I	CHMeOSO ₂ Me	Ms	H
	Et	Me	I	CH ₂ OH	Ms	H
10	Et	Me	I	CH ₂ OMe	Ms	H
	Et	Me	I	CH ₂ OMe	Cl	H
	Et	Me	I	CH ₂ OMe	MeS	H
	Et	Me	I	CH ₂ OMe	MeSO	H
	Et	Me	I	CH ₂ OEt	Ms	H
15	Et	Me	I	CH ₂ OEt	Cl	H
	Et	Me	I	CH ₂ OEt	MeS	H
	Et	Me	I	CH ₂ OEt	MeSO	H
	Et	Me	I	CH ₂ OPr-i	Ms	H
20	Et	Me	I	CH ₂ OPr-n	Ms	H
	Et	Me	I	CH ₂ OCH=CH ₂	Ms	H
	Et	Me	I	CH ₂ OCH ₂ CH=CH ₂	Ms	H
	Et	Me	I	CH ₂ OCH ₂ C≡CH	Ms	H
	Et	Me	I	CH ₂ OCH ₂ CH ₂ Cl	Ms	H
25	Et	Me	I	CHMeOH	Ms	H
	Et	Me	I	CHMeOMe	Ms	H
	Et	Me	I	CHMeOMe	Cl	H
	Et	Me	I	CHMeOMe	MeS	H
	Et	Me	I	CHMeOMe	MeSO	H
30	Et	Me	I	CHMeOEt	Ms	H
	Et	Me	I	CH ₂ CH ₂ OMe	Ms	H
	Et	Me	I	CH ₂ CH ₂ OEt	Ms	H
	Et	Me	I	CH ₂ OH	Ms	H
35	Et	Me	I	CH ₂ OMe	Ms	H
	Et	Me	I	CH ₂ OEt	Ms	H
	Et	Me	I	CH ₂ OCH ₂ CH ₂ OMe	Ms	H
	Et	Me	I	CH ₂ NMe ₂	Ms	H
	Et	Me	I	CH ₂ OCH ₂ Ph	Ms	H
40	Et	Me	I	CH ₂ OCH ₂ CO ₂ Me	Ms	H
	Et	Me	I	CH ₂ OCH ₂ CO ₂ Et	Ms	H
	Et	Me	I	CH ₂ OCHMeCO ₂ Me	Ms	H
	Et	Me	I	CH ₂ CN	Ms	H
45	Et	Me	I	CH ₂ SMe	Ms	H
	Et	Me	I	CH ₂ SEt	Ms	H
	Et	Me	I	CH ₂ SO ₂ Me	Ms	H
	Et	Me	I	CH ₂ SO ₂ Et	Ms	H
	Et	Me	I	CH ₂ SCH ₂ CH ₂ OMe	Ms	H

50

55

	A	B	X	Y	Z	Q
5	Et	Me	I	CH ₂ OCOMe	Ms	H
	Et	Me	I	CHMeOCOMe	Ms	H
	Et	Me	I	CH ₂ OSO ₂ Me	Ms	H
	Et	Me	I	CHMeOSO ₂ Me	Ms	H
10	Pr-i	Me	I	CH ₂ OH	Ms	H
	Pr-i	Me	I	CH ₂ OMe	Ms	H
	Pr-i	Me	I	CH ₂ OMe	Cl	H
	Pr-i	Me	I	CH ₂ OMe	MeS	H
15	Pr-i	Me	I	CH ₂ OMe	MeSO	H
	Pr-i	Me	I	CH ₂ OE _t	Ms	H
	Pr-i	Me	I	CH ₂ OE _t	Cl	H
	Pr-i	Me	I	CH ₂ OE _t	MeS	H
	Pr-i	Me	I	CH ₂ OE _t	MeSO	H
20	Pr-i	Me	I	CH ₂ OPr-i	Ms	H
	Pr-i	Me	I	CH ₂ OPr-n	Ms	H
	Pr-i	Me	I	CH ₂ OCH=CH ₂	Ms	H
	Pr-i	Me	I	CH ₂ OCH ₂ CH=CH ₂	Ms	H
25	Pr-i	Me	I	CH ₂ OCH ₂ C≡CH	Ms	H
	Pr-i	Me	I	CH ₂ OCH ₂ CH ₂ Cl	Ms	H
	Pr-i	Me	I	CHMeOH	Ms	H
	Pr-i	Me	I	CHMeOMe	Ms	H
	Pr-i	Me	I	CHMeOMe	Cl	H
30	Pr-i	Me	I	CHMeOMe	MeS	H
	Pr-i	Me	I	CHMeOMe	MeSO	H
	Pr-i	Me	I	CHMeOE _t	Ms	H
	Pr-i	Me	I	CH ₂ CH ₂ OMe	Ms	H
	Pr-i	Me	I	CH ₂ CH ₂ OE _t	Ms	H
35	Pr-i	Me	I	CHEtOH	Ms	H
	Pr-i	Me	I	CHEtOMe	Ms	H
	Pr-i	Me	I	CHEtOE _t	Ms	H
	Pr-i	Me	I	CH ₂ OCH ₂ CH ₂ OMe	Ms	H
40	Pr-i	Me	I	CH ₂ NMe ₂	Ms	H
	Pr-i	Me	I	CH ₂ OCH ₂ Ph	Ms	H
	Pr-i	Me	I	CH ₂ OCH ₂ CO ₂ Me	Ms	H
	Pr-i	Me	I	CH ₂ OCH ₂ CO ₂ E _t	Ms	H
	Pr-i	Me	I	CH ₂ OCHMeCO ₂ Me	Ms	H
45	Pr-i	Me	I	CH ₂ CN	Ms	H
	Pr-i	Me	I	CH ₂ SMe	Ms	H
	Pr-i	Me	I	CH ₂ SE _t	Ms	H
	Pr-i	Me	I	CH ₂ SO ₂ Me	Ms	H

50

55

	A	E	X	Y	Z	Q
5	Pr-i	Me	I	CH ₂ SO ₂ Et	Ms	H
	Pr-i	Me	I	CH ₂ SCH ₂ CH ₂ OMe	Ms	H
	Pr-i	Me	I	CH ₂ OCOMe	Ms	H
	Pr-i	Me	I	CHMeOCOMe	Ms	H
	Pr-i	Me	I	CH ₂ OSO ₂ Me	Ms	H
10	Pr-i	Me	I	CHMeOSO ₂ Me	Ms	H

15

20

25

30

35

40

45

50

55

	A	E	X	Y	Z	Q
5	Me	Me	Et	CH ₂ OH	Ms	H
	Me	Me	Et	CH ₂ OMe	Ms	H
	Me	Me	Et	CH ₂ OMe	Cl	H
	Me	Me	Et	CH ₂ OMe	MeS	H
10	Me	Me	Et	CH ₂ OMe	MeSO	H
	Me	Me	Et	CH ₂ OEt	Ms	H
	Me	Me	Et	CH ₂ OEt	Cl	H
	Me	Me	Et	CH ₂ OEt	MeS	H
15	Me	Me	Et	CH ₂ OEt	MeSO	H
	Me	Me	Et	CH ₂ OPr-i	Ms	H
	Me	Me	Et	CH ₂ OPr-n	Ms	H
	Me	Me	Et	CH ₂ OCH=CH ₂	Ms	H
	Me	Me	Et	CH ₂ OCH ₂ CH=CH ₂	Ms	H
20	Me	Me	Et	CH ₂ OCH ₂ C≡CH	Ms	H
	Me	Me	Et	CH ₂ OCH ₂ CH ₂ Cl	Ms	H
	Me	Me	Et	CHMeOH	Ms	H
	Me	Me	Et	CHMeOMe	Ms	H
25	Me	Me	Et	CHMeOMe	Cl	H
	Me	Me	Et	CHMeOMe	MeS	H
	Me	Me	Et	CHMeOMe	MeSO	H
	Me	Me	Et	CHMeOEt	Ms	H
	Me	Me	Et	CH ₂ CH ₂ OMe	Ms	H
30	Me	Me	Et	CH ₂ CH ₂ OEt	Ms	H
	Me	Me	Et	CHEtOH	Ms	H
	Me	Me	Et	CHEtOMe	Ms	H
	Me	Me	Et	CHEtOEt	Ms	H
	Me	Me	Et	CH ₂ OCH ₂ CH ₂ OMe	Ms	H
35	Me	Me	Et	CH ₂ NMe ₂	Ms	H
	Me	Me	Et	CH ₂ OCH ₂ Ph	Ms	H
	Me	Me	Et	CH ₂ OCH ₂ CO ₂ Me	Ms	H
	Me	Me	Et	CH ₂ OCH ₂ CO ₂ Et	Ms	H
40	Me	Me	Et	CH ₂ OCHMeCO ₂ Me	Ms	H
	Me	Me	Et	CH ₂ CN	Ms	H
	Me	Me	Et	CH ₂ SMe	Ms	H
	Me	Me	Et	CH ₂ SEt	Ms	H
	Me	Me	Et	CH ₂ SO ₂ Me	Ms	H
45	Me	Me	Et	CH ₂ SO ₂ Et	Ms	H
	Me	Me	Et	CH ₂ SCH ₂ CH ₂ OMe	Ms	H
	Me	Me	Et	CH ₂ OCOMe	Ms	H
	Me	Me	Et	CHMeOCOMe	Ms	H

50

55

	A	B	X	Y	Z	Q
5	Me	Me	Et	CH ₂ OSO ₂ Me	Ms	H
	Me	Me	Et	CHMeOSO ₂ Me	Ms	H
	Et	Me	Et	CH ₂ OH	Ms	H
	Et	Me	Et	CH ₂ OMe	Ms	H
10	Et	Me	Et	CH ₂ OMe	Cl	H
	Et	Me	Et	CH ₂ OMe	MeS	H
	Et	Me	Et	CH ₂ OMe	MeSO	H
	Et	Me	Et	CH ₂ OEt	Ms	H
15	Et	Me	Et	CH ₂ OEt	Cl	H
	Et	Me	Et	CH ₂ OEt	MeS	H
	Et	Me	Et	CH ₂ OEt	MeSO	H
	Et	Me	Et	CH ₂ OPr-i	Ms	H
	Et	Me	Et	CH ₂ OPr-n	Ms	H
20	Et	Me	Et	CH ₂ OCH=CH ₂	Ms	H
	Et	Me	Et	CH ₂ OCH ₂ CH=CH ₂	Ms	H
	Et	Me	Et	CH ₂ OCH ₂ C≡CH	Ms	H
	Et	Me	Et	CH ₂ OCH ₂ CH ₂ Cl	Ms	H
25	Et	Me	Et	CHMeOH	Ms	H
	Et	Me	Et	CHMeOMe	Ms	H
	Et	Me	Et	CHMeOMe	Cl	H
	Et	Me	Et	CHMeOMe	MeS	H
	Et	Me	Et	CHMeOMe	MeSO	H
30	Et	Me	Et	CHMeOEt	Ms	H
	Et	Me	Et	CH ₂ CH ₂ OMe	Ms	H
	Et	Me	Et	CH ₂ CH ₂ OEt	Ms	H
	Et	Me	Et	CHEtOH	Ms	H
	Et	Me	Et	CHEtOMe	Ms	H
35	Et	Me	Et	CHEtOEt	Ms	H
	Et	Me	Et	CH ₂ OCH ₂ CH ₂ OMe	Ms	H
	Et	Me	Et	CH ₂ NMe ₂	Ms	H
	Et	Me	Et	CH ₂ OCH ₂ Ph	Ms	H
40	Et	Me	Et	CH ₂ OCH ₂ CO ₂ Me	Ms	H
	Et	Me	Et	CH ₂ OCH ₂ CO ₂ Et	Ms	H
	Et	Me	Et	CH ₂ OCHMeCO ₂ Me	Ms	H
	Et	Me	Et	CH ₂ CN	Ms	H
	Et	Me	Et	CH ₂ SMe	Ms	H
45	Et	Me	Et	CH ₂ SEt	Ms	H
	Et	Me	Et	CH ₂ SO ₂ Me	Ms	H
	Et	Me	Et	CH ₂ SO ₂ Et	Ms	H
	Et	Me	Et	CH ₂ SCH ₂ CH ₂ OMe	Ms	H
50						
55						

	A	E	X	Y	Z	Q
5	Et	Me	Et	CH ₂ OCOMe	Ms	H
	Et	Me	Et	CHMeOCOMe	Ms	H
	Et	Me	Et	CH ₂ OSO ₂ Me	Ms	H
	Et	Me	Et	CHMeOSO ₂ Me	Ms	H
10	Pr-i	Me	Et	CH ₂ OH	Ms	H
	Pr-i	Me	Et	CH ₂ OMe	Ms	H
	Pr-i	Me	Et	CH ₂ OMe	Cl	H
	Pr-i	Me	Et	CH ₂ OMe	MeS	H
	Pr-i	Me	Et	CH ₂ OMe	MeSO	H
15	Pr-i	Me	Et	CH ₂ OE t	Ms	H
	Pr-i	Me	Et	CH ₂ OE t	Cl	H
	Pr-i	Me	Et	CH ₂ OE t	MeS	H
	Pr-i	Me	Et	CH ₂ OE t	MeSO	H
20	Pr-i	Me	Et	CH ₂ OPr-i	Ms	H
	Pr-i	Me	Et	CH ₂ OPr-n	Ms	H
	Pr-i	Me	Et	CH ₂ OCH=CH ₂	Ms	H
	Pr-i	Me	Et	CH ₂ OCH ₂ CH=CH ₂	Ms	H
	Pr-i	Me	Et	CH ₂ OCH ₂ C≡CH	Ms	H
25	Pr-i	Me	Et	CH ₂ OCH ₂ CH ₂ Cl	Ms	H
	Pr-i	Me	Et	CHMeOH	Ms	H
	Pr-i	Me	Et	CHMeOMe	Ms	H
	Pr-i	Me	Et	CHMeOMe	Cl	H
	Pr-i	Me	Et	CHMeOMe	MeS	H
30	Pr-i	Me	Et	CHMeOMe	MeSO	H
	Pr-i	Me	Et	CHMeOE t	Ms	H
	Pr-i	Me	Et	CH ₂ CH ₂ OMe	Ms	H
	Pr-i	Me	Et	CH ₂ CH ₂ OE t	Ms	H
35	Pr-i	Me	Et	CHEtOH	Ms	H
	Pr-i	Me	Et	CHEtOMe	Ms	H
	Pr-i	Me	Et	CHEtOE t	Ms	H
	Pr-i	Me	Et	CH ₂ OCH ₂ CH ₂ OMe	Ms	H
	Pr-i	Me	Et	CH ₂ NMe ₂	Ms	H
40	Pr-i	Me	Et	CH ₂ OCH ₂ Ph	Ms	H
	Pr-i	Me	Et	CH ₂ OCH ₂ CO ₂ Me	Ms	H
	Pr-i	Me	Et	CH ₂ OCH ₂ CO ₂ Et	Ms	H
	Pr-i	Me	Et	CH ₂ OCHMeCO ₂ Me	Ms	H
45	Pr-i	Me	Et	CH ₂ CN	Ms	H
	Pr-i	Me	Et	CH ₂ SMe	Ms	H
	Pr-i	Me	Et	CH ₂ SEt	Ms	H
	Pr-i	Me	Et	CH ₂ SO ₂ Me	Ms	H

50

55

	A	B	X	Y	Z	Q
5	Pr-i	Me	Et	CH ₂ SO ₂ Et	Ms	H
	Pr-i	Me	Et	CH ₂ SCH ₂ CH ₂ OMe	Ms	H
	Pr-i	Me	Et	CH ₂ OCOMe	Ms	H
	Pr-i	Me	Et	CHMeOCOMe	Ms	H
	Pr-i	Me	Et	CH ₂ OSO ₂ Me	Ms	H
10	Pr-i	Me	Et	CHMeOSO ₂ Me	Ms	H

15

20

25

30

35

40

45

50

55

	A	B	X	Y	Z	Q
5	CH ₂ CH=CH ₂	H	Me	CH ₂ OH	Ms	H
	CH ₂ CH=CH ₂	H	Me	CH ₂ OMe	Ms	H
	CH ₂ CH=CH ₂	H	Me	CH ₂ OMe	Cl	H
	CH ₂ CH=CH ₂	H	Me	CH ₂ OMe	MeS	H
10	CH ₂ CH=CH ₂	H	Me	CH ₂ OMe	MeSO	H
	CH ₂ CH=CH ₂	H	Me	CH ₂ OE t	Ms	H
	CH ₂ CH=CH ₂	H	Me	CH ₂ OE t	Cl	H
	CH ₂ CH=CH ₂	H	Me	CH ₂ OE t	MeS	H
	CH ₂ CH=CH ₂	H	Me	CH ₂ OE t	MeSO	H
15	CH ₂ CH=CH ₂	H	Me	CH ₂ OPr-i	Ms	H
	CH ₂ CH=CH ₂	H	Me	CH ₂ OPr-n	Ms	H
	CH ₂ CH=CH ₂	H	Me	CH ₂ OCH=CH ₂	Ms	H
	CH ₂ CH=CH ₂	H	Me	CH ₂ OCH ₂ CH=CH ₂	Ms	H
20	CH ₂ CH=CH ₂	H	Me	CH ₂ OCH ₂ C≡CH	Ms	H
	CH ₂ CH=CH ₂	H	Me	CH ₂ OCH ₂ CH ₂ Cl	Ms	H
	CH ₂ CH=CH ₂	H	Me	CHMeOH	Ms	H
	CH ₂ CH=CH ₂	H	Me	CHMeOMe	Ms	H
	CH ₂ CH=CH ₂	H	Me	CHMeOMe	Cl	H
25	CH ₂ CH=CH ₂	H	Me	CHMeOMe	MeS	H
	CH ₂ CH=CH ₂	H	Me	CHMeOMe	MeSO	H
	CH ₂ CH=CH ₂	H	Me	CHMeOE t	Ms	H
	CH ₂ CH=CH ₂	H	Me	CHMeOCH=CH ₂	Ms	H
	CH ₂ CH=CH ₂	H	Me	CHMeOCH=CH ₂	Ms	H
30	CH ₂ CH=CH ₂	H	Me	CHMeOCH ₂ CH=CH ₂	Ms	H
	CH ₂ CH=CH ₂	H	Me	CHMeOCH ₂ C≡CH	Ms	H
	CH ₂ CH=CH ₂	H	Me	CHMeOCH ₂ CH ₂ Cl	Ms	H
	CH ₂ CH=CH ₂	H	Me	CMe ₂ OH	Ms	H
35	CH ₂ CH=CH ₂	H	Me	CMe ₂ OMe	Ms	H
	CH ₂ CH=CH ₂	H	Me	CMe ₂ OE t	Ms	H
	CH ₂ CH=CH ₂	H	Me	CH ₂ CH ₂ OMe	Ms	H
	CH ₂ CH=CH ₂	H	Me	CH ₂ CH ₂ OE t	Ms	H
	CH ₂ CH=CH ₂	H	Me	CHEtOH	Ms	H
40	CH ₂ CH=CH ₂	H	Me	CHEtOMe	Ms	H
	CH ₂ CH=CH ₂	H	Me	CHEtOE t	Ms	H
	CH ₂ CH=CH ₂	H	Me	CH ₂ OCH ₂ CH ₂ OMe	Ms	H
	CH ₂ CH=CH ₂	H	Me	CHMeOCH ₂ CH ₂ OMe	Ms	H
	CH ₂ CH=CH ₂	H	Me	CH ₂ NMe ₂	Ms	H
45	CH ₂ CH=CH ₂	H	Me	CHMeNMe ₂	Ms	H
	CH ₂ CH=CH ₂	H	Me	CH ₂ CH ₂ NMe ₂	Ms	H
	CH ₂ CH=CH ₂	H	Me	CH ₂ OCH ₂ Ph	Ms	H

50

55

	A	B	X	Y	Z	Q
5	CH ₂ CH=CH ₂	H	Me	CHMeOCH ₂ Ph	Ms	H
	CH ₂ CH=CH ₂	H	Me	CH ₂ OCH ₂ CO ₂ Me	Ms	H
	CH ₂ CH=CH ₂	H	Me	CH ₂ OCH ₂ CO ₂ Et	Ms	H
	CH ₂ CH=CH ₂	H	Me	CH ₂ OCHMeCO ₂ Me	Ms	H
10	CH ₂ CH=CH ₂	H	Me	CH ₂ CN	Ms	H
	CH ₂ CH=CH ₂	H	Me	CH ₂ SMe	Ms	H
	CH ₂ CH=CH ₂	H	Me	CH ₂ SEt	Ms	H
	CH ₂ CH=CH ₂	H	Me	CH ₂ SOMe	Ms	H
	CH ₂ CH=CH ₂	H	Me	CH ₂ SO ₂ Me	Ms	H
15	CH ₂ CH=CH ₂	H	Me	CH ₂ SO ₂ Et	Ms	H
	CH ₂ CH=CH ₂	H	Me	CHMeSMe	Ms	H
	CH ₂ CH=CH ₂	H	Me	CHMeSO ₂ Me	Ms	H
	CH ₂ CH=CH ₂	H	Me	CH ₂ SCH ₂ CH ₂ OMe	Ms	H
20	CH ₂ CH=CH ₂	H	Me	CH ₂ OCOMe	Ms	H
	CH ₂ CH=CH ₂	H	Me	CHMeOCOMe	Ms	H
	CH ₂ CH=CH ₂	H	Me	CH ₂ OSO ₂ Me	Ms	H
	CH ₂ CH=CH ₂	H	Me	CHMeOSO ₂ Me	Ms	H
	CH ₂ C≡CH	H	Me	CH ₂ OH	Ms	H
25	CH ₂ C≡CH	H	Me	CH ₂ OMe	Ms	H
	CH ₂ C≡CH	H	Me	CH ₂ OMe	Cl	H
	CH ₂ C≡CH	H	Me	CH ₂ OMe	MeS	H
	CH ₂ C≡CH	H	Me	CH ₂ OMe	MeSO	H
30	CH ₂ C≡CH	H	Me	CH ₂ OEt	Ms	H
	CH ₂ C≡CH	H	Me	CH ₂ OEt	Cl	H
	CH ₂ C≡CH	H	Me	CH ₂ OEt	MeS	H
	CH ₂ C≡CH	H	Me	CH ₂ OEt	MeSO	H
	CH ₂ C≡CH	H	Me	CH ₂ OPr-i	Ms	H
35	CH ₂ C≡CH	H	Me	CH ₂ OPr-n	Ms	H
	CH ₂ C≡CH	H	Me	CH ₂ OCH=CH ₂	Ms	H
	CH ₂ C≡CH	H	Me	CH ₂ OCH ₂ CH=CH ₂	Ms	H
	CH ₂ C≡CH	H	Me	CH ₂ OCH ₂ C≡CH	Ms	H
	CH ₂ C≡CH	H	Me	CH ₂ OCH ₂ CH ₂ Cl	Ms	H
40	CH ₂ C≡CH	H	Me	CHMeOH	Ms	H
	CH ₂ C≡CH	H	Me	CHMeOMe	Ms	H
	CH ₂ C≡CH	H	Me	CHMeOMe	Cl	H
	CH ₂ C≡CH	H	Me	CHMeOMe	MeS	H
45	CH ₂ C≡CH	H	Me	CHMeOMe	MeSO	H
	CH ₂ C≡CH	H	Me	CHMeOEt	Ms	H
	CH ₂ C≡CH	H	Me	CHMeOCH=CH ₂	Ms	H
	CH ₂ C≡CH	H	Me	CHMeOCH=CH ₂	Ms	H

50

55

	A	B	X	Y	Z	Q
5	CH ₂ C ≡ CH	H	Me	CHMeOCH ₂ CH = CH ₂	Ms	H
	CH ₂ C ≡ CH	H	Me	CHMeOCH ₂ C ≡ CH	Ms	H
	CH ₂ C ≡ CH	H	Me	CHMeOCH ₂ CH ₂ Cl	Ms	H
	CH ₂ C ≡ CH	H	Me	CMe ₂ OH	Ms	H
10	CH ₂ C ≡ CH	H	Me	CMe ₂ OMe	Ms	H
	CH ₂ C ≡ CH	H	Me	CMe ₂ OEt	Ms	H
	CH ₂ C ≡ CH	H	Me	CH ₂ CH ₂ OMe	Ms	H
	CH ₂ C ≡ CH	H	Me	CH ₂ CH ₂ OEt	Ms	H
	CH ₂ C ≡ CH	H	Me	CH ₂ CH ₂ OH	Ms	H
15	CH ₂ C ≡ CH	H	Me	CH ₂ CH ₂ OMe	Ms	H
	CH ₂ C ≡ CH	H	Me	CH ₂ CH ₂ OEt	Ms	H
	CH ₂ C ≡ CH	H	Me	CH ₂ OCH ₂ CH ₂ OMe	Ms	H
	CH ₂ C ≡ CH	H	Me	CHMeOCH ₂ CH ₂ OMe	Ms	H
20	CH ₂ C ≡ CH	H	Me	CH ₂ NMe ₂	Ms	H
	CH ₂ C ≡ CH	H	Me	CHMeNMe ₂	Ms	H
	CH ₂ C ≡ CH	H	Me	CH ₂ CH ₂ NMe ₂	Ms	H
	CH ₂ C ≡ CH	H	Me	CH ₂ OCH ₂ Ph	Ms	H
	CH ₂ C ≡ CH	H	Me	CHMeOCH ₂ Ph	Ms	H
25	CH ₂ C ≡ CH	H	Me	CH ₂ OCH ₂ CO ₂ Me	Ms	H
	CH ₂ C ≡ CH	H	Me	CH ₂ OCH ₂ CO ₂ Et	Ms	H
	CH ₂ C ≡ CH	H	Me	CH ₂ OCHMeCO ₂ Me	Ms	H
	CH ₂ C ≡ CH	H	Me	CH ₂ CN	Ms	H
	CH ₂ C ≡ CH	H	Me	CH ₂ SMe	Ms	H
30	CH ₂ C ≡ CH	H	Me	CH ₂ SEt	Ms	H
	CH ₂ C ≡ CH	H	Me	CH ₂ SOMe	Ms	H
	CH ₂ C ≡ CH	H	Me	CH ₂ SO ₂ Me	Ms	H
	CH ₂ C ≡ CH	H	Me	CH ₂ SO ₂ Et	Ms	H
35	CH ₂ C ≡ CH	H	Me	CHMeSMe	Ms	H
	CH ₂ C ≡ CH	H	Me	CHMeSO ₂ Me	Ms	H
	CH ₂ C ≡ CH	H	Me	CH ₂ SCH ₂ CH ₂ OMe	Ms	H
	CH ₂ C ≡ CH	H	Me	CH ₂ OCOMe	Ms	H
	CH ₂ C ≡ CH	H	Me	CHMeOCOMe	Ms	H
40	CH ₂ C ≡ CH	H	Me	CH ₂ OSO ₂ Me	Ms	H
	CH ₂ C ≡ CH	H	Me	CHMeOSO ₂ Me	Ms	H
	CH ₂ CH = CH ₂	H	Cl	CH ₂ OH	Ms	H
	CH ₂ CH = CH ₂	H	Cl	CH ₂ OMe	Ms	H
	CH ₂ CH = CH ₂	H	Cl	CH ₂ OMe	Cl	H
45	CH ₂ CH = CH ₂	H	Cl	CH ₂ OMe	MeS	H
	CH ₂ CH = CH ₂	H	Cl	CH ₂ OMe	MeSO	H
	CH ₂ CH = CH ₂	H	Cl	CH ₂ OEt	Ms	H

50

55

	A	E	X	Y	Z	Q
5	CH ₂ CH=CH ₂	H	Cl	CH ₂ OEt	Cl	H
	CH ₂ CH=CH ₂	H	Cl	CH ₂ OEt	MeS	H
	CH ₂ CH=CH ₂	H	Cl	CH ₂ OEt	MeSO	H
	CH ₂ CH=CH ₂	H	Cl	CH ₂ OPr-i	Ms	H
10	CH ₂ CH=CH ₂	H	Cl	CH ₂ OPr-n	Ms	H
	CH ₂ CH=CH ₂	H	Cl	CH ₂ OCH=CH ₂	Ms	H
	CH ₂ CH=CH ₂	H	Cl	CH ₂ OCH ₂ CH=CH ₂	Ms	H
	CH ₂ CH=CH ₂	H	Cl	CH ₂ OCH ₂ C≡CH	Ms	H
	CH ₂ CH=CH ₂	H	Cl	CH ₂ OCH ₂ CH ₂ Cl	Ms	H
15	CH ₂ CH=CH ₂	H	Cl	CHMeOH	Ms	H
	CH ₂ CH=CH ₂	H	Cl	CHMeOMe	Ms	H
	CH ₂ CH=CH ₂	H	Cl	CHMeOMe	Cl	H
	CH ₂ CH=CH ₂	H	Cl	CHMeOMe	MeS	H
20	CH ₂ CH=CH ₂	H	Cl	CHMeOMe	MeSO	H
	CH ₂ CH=CH ₂	H	Cl	CHMeOEt	Ms	H
	CH ₂ CH=CH ₂	H	Cl	CHMeOCH=CH ₂	Ms	H
	CH ₂ CH=CH ₂	H	Cl	CHMeOCH=CH ₂	Ms	H
	CH ₂ CH=CH ₂	H	Cl	CHMeOCH ₂ CH=CH ₂	Ms	H
25	CH ₂ CH=CH ₂	H	Cl	CHMeOCH ₂ C≡CH	Ms	H
	CH ₂ CH=CH ₂	H	Cl	CHMeOCH ₂ CH ₂ Cl	Ms	H
	CH ₂ CH=CH ₂	H	Cl	CMe ₂ OH	Ms	H
	CH ₂ CH=CH ₂	H	Cl	CMe ₂ OMe	Ms	H
30	CH ₂ CH=CH ₂	H	Cl	CMe ₂ OEt	Ms	H
	CH ₂ CH=CH ₂	H	Cl	CH ₂ CH ₂ OMe	Ms	H
	CH ₂ CH=CH ₂	H	Cl	CH ₂ CH ₂ OEt	Ms	H
	CH ₂ CH=CH ₂	H	Cl	CHEtOH	Ms	H
	CH ₂ CH=CH ₂	H	Cl	CHEtOMe	Ms	H
35	CH ₂ CH=CH ₂	H	Cl	CHEtOEt	Ms	H
	CH ₂ CH=CH ₂	H	Cl	CH ₂ OCH ₂ CH ₂ OMe	Ms	H
	CH ₂ CH=CH ₂	H	Cl	CHMeOCH ₂ CH ₂ OMe	Ms	H
	CH ₂ CH=CH ₂	H	Cl	CH ₂ NMe ₂	Ms	H
	CH ₂ CH=CH ₂	H	Cl	CHMeNMe ₂	Ms	H
40	CH ₂ CH=CH ₂	H	Cl	CH ₂ CH ₂ NMe ₂	Ms	H
	CH ₂ CH=CH ₂	H	Cl	CH ₂ OCH ₂ Ph	Ms	H
	CH ₂ CH=CH ₂	H	Cl	CHMeOCH ₂ Ph	Ms	H
	CH ₂ CH=CH ₂	H	Cl	CH ₂ OCH ₂ CO ₂ Me	Ms	H
	CH ₂ CH=CH ₂	H	Cl	CH ₂ OCH ₂ CO ₂ Et	Ms	H
45	CH ₂ CH=CH ₂	H	Cl	CH ₂ OCHMeCO ₂ Me	Ms	H
	CH ₂ CH=CH ₂	H	Cl	CH ₂ CN	Ms	H
	CH ₂ CH=CH ₂	H	Cl	CH ₂ SMe	Ms	H

50

55

	A	E	X	Y	Z	Q
5	$\text{CH}_2\text{CH}=\text{CH}_2$	H	Cl	CH_2SEt	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	H	Cl	CH_2SOMe	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	H	Cl	$\text{CH}_2\text{SO}_2\text{Me}$	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	H	Cl	$\text{CH}_2\text{SO}_2\text{Et}$	Ms	H
10	$\text{CH}_2\text{CH}=\text{CH}_2$	H	Cl	CHMeSMe	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	H	Cl	CHMeSO_2Me	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	H	Cl	$\text{CH}_2\text{SCH}_2\text{CH}_2\text{OMe}$	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	H	Cl	CH_2OCOMe	Ms	H
15	$\text{CH}_2\text{CH}=\text{CH}_2$	H	Cl	CHMeOCOMe	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	H	Cl	$\text{CH}_2\text{OSO}_2\text{Me}$	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	H	Cl	$\text{CHMeOSO}_2\text{Me}$	Ms	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	H	Cl	CH_2OH	Ms	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	H	Cl	CH_2OMe	Ms	H
20	$\text{CH}_2\text{C}\equiv\text{CH}$	H	Cl	CH_2OMe	Cl	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	H	Cl	CH_2OMe	MeS	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	H	Cl	CH_2OMe	MeSO	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	H	Cl	CH_2OEt	Ms	H
25	$\text{CH}_2\text{C}\equiv\text{CH}$	H	Cl	CH_2OEt	Cl	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	H	Cl	CH_2OEt	MeS	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	H	Cl	CH_2OEt	MeSO	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	H	Cl	$\text{CH}_2\text{OPr-i}$	Ms	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	H	Cl	$\text{CH}_2\text{OPr-n}$	Ms	H
30	$\text{CH}_2\text{C}\equiv\text{CH}$	H	Cl	$\text{CH}_2\text{OCH}=\text{CH}_2$	Ms	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	H	Cl	$\text{CH}_2\text{OCH}_2\text{CH}=\text{CH}_2$	Ms	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	H	Cl	$\text{CH}_2\text{OCH}_2\text{C}\equiv\text{CH}$	Ms	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	H	Cl	$\text{CH}_2\text{OCH}_2\text{CH}_2\text{Cl}$	Ms	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	H	Cl	CHMeOH	Ms	H
35	$\text{CH}_2\text{C}\equiv\text{CH}$	H	Cl	CHMeOMe	Ms	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	H	Cl	CHMeOMe	Cl	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	H	Cl	CHMeOMe	MeS	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	H	Cl	CHMeOMe	MeSO	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	H	Cl	CHMeOEt	Ms	H
40	$\text{CH}_2\text{C}\equiv\text{CH}$	H	Cl	$\text{CHMeOCH}=\text{CH}_2$	Ms	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	H	Cl	$\text{CHMeOCH}=\text{CH}_2$	Ms	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	H	Cl	$\text{CHMeOCH}_2\text{CH}=\text{CH}_2$	Ms	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	H	Cl	$\text{CHMeOCH}_2\text{C}\equiv\text{CH}$	Ms	H
45	$\text{CH}_2\text{C}\equiv\text{CH}$	H	Cl	$\text{CHMeOCH}_2\text{CH}_2\text{Cl}$	Ms	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	H	Cl	CHMe_2OH	Ms	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	H	Cl	CHMe_2OMe	Ms	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	H	Cl	CHMe_2OEt	Ms	H

50

55

	A	B	X	Y	Z	Q
5	$\text{CH}_2\text{C} \equiv \text{CH}$	H	Cl	$\text{CH}_2\text{CH}_2\text{OMe}$	Ms	H
	$\text{CH}_2\text{C} \equiv \text{CH}$	H	Cl	$\text{CH}_2\text{CH}_2\text{OEt}$	Ms	H
	$\text{CH}_2\text{C} \equiv \text{CH}$	H	Cl	CHEtOH	Ms	H
	$\text{CH}_2\text{C} \equiv \text{CH}$	H	Cl	CHEtOMe	Ms	H
	$\text{CH}_2\text{C} \equiv \text{CH}$	H	Cl	CHEtOEt	Ms	H
10	$\text{CH}_2\text{C} \equiv \text{CH}$	H	Cl	$\text{CH}_2\text{OCH}_2\text{CH}_2\text{OMe}$	Ms	H
	$\text{CH}_2\text{C} \equiv \text{CH}$	H	Cl	$\text{CHMeOCH}_2\text{CH}_2\text{OMe}$	Ms	H
	$\text{CH}_2\text{C} \equiv \text{CH}$	H	Cl	CH_2NMe_2	Ms	H
	$\text{CH}_2\text{C} \equiv \text{CH}$	H	Cl	CHMeNMe_2	Ms	H
15	$\text{CH}_2\text{C} \equiv \text{CH}$	H	Cl	$\text{CH}_2\text{CH}_2\text{NMe}_2$	Ms	H
	$\text{CH}_2\text{C} \equiv \text{CH}$	H	Cl	$\text{CH}_2\text{OCH}_2\text{Ph}$	Ms	H
	$\text{CH}_2\text{C} \equiv \text{CH}$	H	Cl	$\text{CHMeOCH}_2\text{Ph}$	Ms	H
	$\text{CH}_2\text{C} \equiv \text{CH}$	H	Cl	$\text{CH}_2\text{OCH}_2\text{CO}_2\text{Me}$	Ms	H
	$\text{CH}_2\text{C} \equiv \text{CH}$	H	Cl	$\text{CH}_2\text{OCH}_2\text{CO}_2\text{Et}$	Ms	H
20	$\text{CH}_2\text{C} \equiv \text{CH}$	H	Cl	$\text{CH}_2\text{OCHMeCO}_2\text{Me}$	Ms	H
	$\text{CH}_2\text{C} \equiv \text{CH}$	H	Cl	CH_2CN	Ms	H
	$\text{CH}_2\text{C} \equiv \text{CH}$	H	Cl	CH_2SMe	Ms	H
	$\text{CH}_2\text{C} \equiv \text{CH}$	H	Cl	CH_2SEt	Ms	H
25	$\text{CH}_2\text{C} \equiv \text{CH}$	H	Cl	CH_2SOMe	Ms	H
	$\text{CH}_2\text{C} \equiv \text{CH}$	H	Cl	$\text{CH}_2\text{SO}_2\text{Me}$	Ms	H
	$\text{CH}_2\text{C} \equiv \text{CH}$	H	Cl	$\text{CH}_2\text{SO}_2\text{Et}$	Ms	H
	$\text{CH}_2\text{C} \equiv \text{CH}$	H	Cl	CHMeSMe	Ms	H
	$\text{CH}_2\text{C} \equiv \text{CH}$	H	Cl	CHMeSO_2Me	Ms	H
30	$\text{CH}_2\text{C} \equiv \text{CH}$	H	Cl	$\text{CH}_2\text{SCH}_2\text{CH}_2\text{OMe}$	Ms	H
	$\text{CH}_2\text{C} \equiv \text{CH}$	H	Cl	CH_2OCOMe	Ms	H
	$\text{CH}_2\text{C} \equiv \text{CH}$	H	Cl	CHMeOCOMe	Ms	H
	$\text{CH}_2\text{C} \equiv \text{CH}$	H	Cl	$\text{CH}_2\text{OSO}_2\text{Me}$	Ms	H
	$\text{CH}_2\text{C} \equiv \text{CH}$	H	Cl	$\text{CHMeOSO}_2\text{Me}$	Ms	H
35	$\text{CH}_2\text{CH}=\text{CH}_2$	H	MeO	CH_2OH	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	H	MeO	CH_2OMe	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	H	MeO	CH_2OMe	Cl	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	H	MeO	CH_2OMe	MeS	H
40	$\text{CH}_2\text{CH}=\text{CH}_2$	H	MeO	CH_2OMe	MeSO	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	H	MeO	CH_2OEt	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	H	MeO	CH_2OEt	Cl	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	H	MeO	CH_2OEt	MeS	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	H	MeO	CH_2OEt	MeSO	H
45	$\text{CH}_2\text{CH}=\text{CH}_2$	H	MeO	$\text{CH}_2\text{OPr-i}$	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	H	MeO	$\text{CH}_2\text{OPr-n}$	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	H	MeO	$\text{CH}_2\text{OCH}=\text{CH}_2$	Ms	H

50

55

	A	B	X	Y	Z	Q
	$\text{CH}_2\text{CH}=\text{CH}_2$	H	MeO	$\text{CH}_2\text{OCH}_2\text{CH}=\text{CH}_2$	Ms	H
5	$\text{CH}_2\text{CH}=\text{CH}_2$	H	MeO	$\text{CH}_2\text{OCH}_2\text{C}\equiv\text{CH}$	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	H	MeO	$\text{CH}_2\text{OCH}_2\text{CH}_2\text{Cl}$	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	H	MeO	CHMeOH	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	H	MeO	CHMeOMe	Ms	H
10	$\text{CH}_2\text{CH}=\text{CH}_2$	H	MeO	CHMeOMe	Cl	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	H	MeO	CHMeOMe	MeS	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	H	MeO	CHMeOMe	MeSO	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	H	MeO	CHMeOEt	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	H	MeO	$\text{CHMeOCH}=\text{CH}_2$	Ms	H
15	$\text{CH}_2\text{CH}=\text{CH}_2$	H	MeO	$\text{CHMeOCH}=\text{CH}_2$	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	H	MeO	$\text{CHMeOCH}_2\text{CH}=\text{CH}_2$	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	H	MeO	$\text{CHMeOCH}_2\text{C}\equiv\text{CH}$	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	H	MeO	$\text{CHMeOCH}_2\text{CH}_2\text{Cl}$	Ms	H
20	$\text{CH}_2\text{CH}=\text{CH}_2$	H	MeO	CMe ₂ OH	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	H	MeO	CMe ₂ OMe	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	H	MeO	CMe ₂ OEt	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	H	MeO	$\text{CH}_2\text{CH}_2\text{OMe}$	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	H	MeO	$\text{CH}_2\text{CH}_2\text{OEt}$	Ms	H
25	$\text{CH}_2\text{CH}=\text{CH}_2$	H	MeO	CHEtOH	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	H	MeO	CHEtOMe	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	H	MeO	CHEtOEt	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	H	MeO	$\text{CH}_2\text{OCH}_2\text{CH}_2\text{OMe}$	Ms	H
30	$\text{CH}_2\text{CH}=\text{CH}_2$	H	MeO	$\text{CHMeOCH}_2\text{CH}_2\text{OMe}$	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	H	MeO	CH_2NMe_2	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	H	MeO	CHMeNMe ₂	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	H	MeO	$\text{CH}_2\text{CH}_2\text{NMe}_2$	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	H	MeO	$\text{CH}_2\text{OCH}_2\text{Ph}$	Ms	H
35	$\text{CH}_2\text{CH}=\text{CH}_2$	H	MeO	CHMeOCH ₂ Ph	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	H	MeO	$\text{CH}_2\text{OCH}_2\text{CO}_2\text{Me}$	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	H	MeO	$\text{CH}_2\text{OCH}_2\text{CO}_2\text{Et}$	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	H	MeO	$\text{CH}_2\text{OCHMeCO}_2\text{Me}$	Ms	H
40	$\text{CH}_2\text{CH}=\text{CH}_2$	H	MeO	CH_2CN	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	H	MeO	CH_2SMe	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	H	MeO	CH_2SEt	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	H	MeO	CH_2SOMe	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	H	MeO	$\text{CH}_2\text{SO}_2\text{Me}$	Ms	H
45	$\text{CH}_2\text{CH}=\text{CH}_2$	H	MeO	$\text{CH}_2\text{SO}_2\text{Et}$	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	H	MeO	CHMeSMe	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	H	MeO	CHMeSO ₂ Me	Ms	H

50

55

	A	B	X	Y	Z	Q
	$\text{CH}_2\text{CH}=\text{CH}_2$	H	MeO	$\text{CH}_2\text{SCH}_2\text{CH}_2\text{OMe}$	Ms	H
5	$\text{CH}_2\text{CH}=\text{CH}_2$	H	MeO	CH_2OCOMe	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	H	MeO	CHMeOCOMe	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	H	MeO	$\text{CH}_2\text{OSO}_2\text{Me}$	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	H	MeO	$\text{CHMeOSO}_2\text{Me}$	Ms	H
10	$\text{CH}_2\text{C}\equiv\text{CH}$	H	MeO	CH_2OH	Ms	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	H	MeO	CH_2OMe	Ms	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	H	MeO	CH_2OMe	Cl	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	H	MeO	CH_2OMe	MeS	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	H	MeO	CH_2OMe	MeSO	H
15	$\text{CH}_2\text{C}\equiv\text{CH}$	H	MeO	CH_2OEt	Ms	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	H	MeO	CH_2OEt	Cl	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	H	MeO	CH_2OEt	MeS	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	H	MeO	CH_2OEt	MeSO	H
20	$\text{CH}_2\text{C}\equiv\text{CH}$	H	MeO	$\text{CH}_2\text{OPr-i}$	Ms	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	H	MeO	$\text{CH}_2\text{OPr-n}$	Ms	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	H	MeO	$\text{CH}_2\text{OCH}=\text{CH}_2$	Ms	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	H	MeO	$\text{CH}_2\text{OCH}_2\text{CH}=\text{CH}_2$	Ms	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	H	MeO	$\text{CH}_2\text{OCH}_2\text{C}\equiv\text{CH}$	Ms	H
25	$\text{CH}_2\text{C}\equiv\text{CH}$	H	MeO	$\text{CH}_2\text{OCH}_2\text{CH}_2\text{Cl}$	Ms	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	H	MeO	CHMeOH	Ms	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	H	MeO	CHMeOMe	Ms	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	H	MeO	CHMeOMe	Cl	H
30	$\text{CH}_2\text{C}\equiv\text{CH}$	H	MeO	CHMeOMe	MeS	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	H	MeO	CHMeOMe	MeSO	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	H	MeO	CHMeOEt	Ms	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	H	MeO	$\text{CHMeOCH}=\text{CH}_2$	Ms	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	H	MeO	$\text{CHMeOCH}=\text{CH}_2$	Ms	H
35	$\text{CH}_2\text{C}\equiv\text{CH}$	H	MeO	$\text{CHMeOCH}_2\text{CH}=\text{CH}_2$	Ms	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	H	MeO	$\text{CHMeOCH}_2\text{C}\equiv\text{CH}$	Ms	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	H	MeO	$\text{CHMeOCH}_2\text{CH}_2\text{Cl}$	Ms	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	H	MeO	CMe_2OH	Ms	H
40	$\text{CH}_2\text{C}\equiv\text{CH}$	H	MeO	CMe_2OMe	Ms	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	H	MeO	CMe_2OEt	Ms	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	H	MeO	$\text{CH}_2\text{CH}_2\text{OMe}$	Ms	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	H	MeO	$\text{CH}_2\text{CH}_2\text{OEt}$	Ms	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	H	MeO	CHEtOH	Ms	H
45	$\text{CH}_2\text{C}\equiv\text{CH}$	H	MeO	CHEtOMe	Ms	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	H	MeO	CHEtOEt	Ms	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	H	MeO	$\text{CH}_2\text{OCH}_2\text{CH}_2\text{OMe}$	Ms	H

50

55

	A	B	X	Y	Z	Q
5	CH ₂ C ≡ CH	H	MeO	CHMeOCH ₂ CH ₂ OMe	Ms	H
	CH ₂ C ≡ CH	H	MeO	CH ₂ NMe ₂	Ms	H
	CH ₂ C ≡ CH	H	MeO	CHMeNMe ₂	Ms	H
	CH ₂ C ≡ CH	H	MeO	CH ₂ CH ₂ NMe ₂	Ms	H
10	CH ₂ C ≡ CH	H	MeO	CH ₂ OCH ₂ Ph	Ms	H
	CH ₂ C ≡ CH	H	MeO	CHMeOCH ₂ Ph	Ms	H
	CH ₂ C ≡ CH	H	MeO	CH ₂ OCH ₂ CO ₂ Me	Ms	H
	CH ₂ C ≡ CH	H	MeO	CH ₂ OCH ₂ CO ₂ Et	Ms	H
	CH ₂ C ≡ CH	H	MeO	CH ₂ OCHMeCO ₂ Me	Ms	H
15	CH ₂ C ≡ CH	H	MeO	CH ₂ CN	Ms	H
	CH ₂ C ≡ CH	H	MeO	CH ₂ SMe	Ms	H
	CH ₂ C ≡ CH	H	MeO	CH ₂ SEt	Ms	H
	CH ₂ C ≡ CH	H	MeO	CH ₂ SOMe	Ms	H
20	CH ₂ C ≡ CH	H	MeO	CH ₂ SO ₂ Me	Ms	H
	CH ₂ C ≡ CH	H	MeO	CH ₂ SO ₂ Et	Ms	H
	CH ₂ C ≡ CH	H	MeO	CHMeSMe	Ms	H
	CH ₂ C ≡ CH	H	MeO	CHMeSO ₂ Me	Ms	H
	CH ₂ C ≡ CH	H	MeO	CH ₂ SCH ₂ CH ₂ OMe	Ms	H
25	CH ₂ C ≡ CH	H	MeO	CH ₂ OCOMe	Ms	H
	CH ₂ C ≡ CH	H	MeO	CHMeOCOMe	Ms	H
	CH ₂ C ≡ CH	H	MeO	CH ₂ OSO ₂ Me	Ms	H
	CH ₂ C ≡ CH	H	MeO	CHMeOSO ₂ Me	Ms	H

30

35

40

45

50

55

	A	B	X	Y	Z	Q
5	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Me	CH_2OH	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Me	CH_2OMe	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Me	CH_2OMe	Cl	H
10	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Me	CH_2OMe	MeS	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Me	CH_2OMe	MeSO	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Me	CH_2OEt	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Me	CH_2OEt	Cl	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Me	CH_2OEt	MeS	H
15	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Me	CH_2OEt	MeSO	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Me	$\text{CH}_2\text{OPr-i}$	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Me	$\text{CH}_2\text{OPr-n}$	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Me	$\text{CH}_2\text{OCH}=\text{CH}_2$	Ms	H
20	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Me	$\text{CH}_2\text{OCH}_2\text{CH}=\text{CH}_2$	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Me	$\text{CH}_2\text{OCH}_2\text{C}\equiv\text{CH}$	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Me	$\text{CH}_2\text{OCH}_2\text{CH}_2\text{Cl}$	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Me	CHMeOH	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Me	CHMeOMe	Ms	H
25	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Me	CHMeOMe	Cl	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Me	CHMeOMe	MeS	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Me	CHMeOMe	MeSO	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Me	CHMeOEt	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Me	$\text{CH}_2\text{CH}_2\text{OMe}$	Ms	H
30	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Me	$\text{CH}_2\text{CH}_2\text{OEt}$	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Me	CHEtOH	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Me	CHEtOMe	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Me	CHEtOEt	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Me	$\text{CH}_2\text{OCH}_2\text{CH}_2\text{OMe}$	Ms	H
35	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Me	CH_2NMe_2	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Me	$\text{CH}_2\text{OCH}_2\text{Ph}$	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Me	$\text{CH}_2\text{OCH}_2\text{CO}_2\text{Me}$	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Me	$\text{CH}_2\text{OCH}_2\text{CO}_2\text{Et}$	Ms	H
40	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Me	$\text{CH}_2\text{OCHMeCO}_2\text{Me}$	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Me	CH_2CN	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Me	CH_2SMe	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Me	CH_2SEt	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Me	$\text{CH}_2\text{SO}_2\text{Me}$	Ms	H
45	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Me	$\text{CH}_2\text{SO}_2\text{Et}$	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Me	$\text{CH}_2\text{SCH}_2\text{CH}_2\text{OMe}$	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Me	CH_2OCOMe	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Me	CHMeOCOMe	Ms	H
50						
55						

	A	B	X	Y	Z	Q
5	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Me	$\text{CH}_2\text{OSO}_2\text{Me}$	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Me	$\text{CHMeOSO}_2\text{Me}$	Ms	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	Me	Me	CH_2OH	Ms	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	Me	Me	CH_2OMe	Ms	H
10	$\text{CH}_2\text{C}\equiv\text{CH}$	Me	Me	CH_2OMe	Cl	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	Me	Me	CH_2OMe	MeS	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	Me	Me	CH_2OMe	MeSO	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	Me	Me	CH_2OEt	Ms	H
15	$\text{CH}_2\text{C}\equiv\text{CH}$	Me	Me	CH_2OEt	Cl	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	Me	Me	CH_2OEt	MeS	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	Me	Me	CH_2OEt	MeSO	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	Me	Me	$\text{CH}_2\text{OPr-i}$	Ms	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	Me	Me	$\text{CH}_2\text{OPr-n}$	Ms	H
20	$\text{CH}_2\text{C}\equiv\text{CH}$	Me	Me	$\text{CH}_2\text{OCH}=\text{CH}_2$	Ms	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	Me	Me	$\text{CH}_2\text{OCH}_2\text{CH}=\text{CH}_2$	Ms	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	Me	Me	$\text{CH}_2\text{OCH}_2\text{C}\equiv\text{CH}$	Ms	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	Me	Me	$\text{CH}_2\text{OCH}_2\text{CH}_2\text{Cl}$	Ms	H
25	$\text{CH}_2\text{C}\equiv\text{CH}$	Me	Me	CHMeOH	Ms	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	Me	Me	CHMeOMe	Ms	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	Me	Me	CHMeOMe	Cl	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	Me	Me	CHMeOMe	MeS	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	Me	Me	CHMeOMe	MeSO	H
30	$\text{CH}_2\text{C}\equiv\text{CH}$	Me	Me	CHMeOEt	Ms	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	Me	Me	$\text{CH}_2\text{CH}_2\text{OMe}$	Ms	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	Me	Me	$\text{CH}_2\text{CH}_2\text{OEt}$	Ms	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	Me	Me	CHEtOH	Ms	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	Me	Me	CHEtOMe	Ms	H
35	$\text{CH}_2\text{C}\equiv\text{CH}$	Me	Me	CHEtOEt	Ms	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	Me	Me	$\text{CH}_2\text{OCH}_2\text{CH}_2\text{OMe}$	Ms	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	Me	Me	CH_2NMe_2	Ms	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	Me	Me	$\text{CH}_2\text{OCH}_2\text{Ph}$	Ms	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	Me	Me	$\text{CH}_2\text{OCH}_2\text{CO}_2\text{Me}$	Ms	H
40	$\text{CH}_2\text{C}\equiv\text{CH}$	Me	Me	$\text{CH}_2\text{OCH}_2\text{CO}_2\text{Et}$	Ms	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	Me	Me	$\text{CH}_2\text{OCHMeCO}_2\text{Me}$	Ms	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	Me	Me	CH_2CN	Ms	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	Me	Me	CH_2SMe	Ms	H
45	$\text{CH}_2\text{C}\equiv\text{CH}$	Me	Me	CH_2SEt	Ms	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	Me	Me	$\text{CH}_2\text{SO}_2\text{Me}$	Ms	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	Me	Me	$\text{CH}_2\text{SO}_2\text{Et}$	Ms	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	Me	Me	$\text{CH}_2\text{SCH}_2\text{CH}_2\text{OMe}$	Ms	H

50

55

	A	B	X	Y	Z	G.
5	$\text{CH}_2\text{C} \equiv \text{CH}$	Me	Me	CH_2OCOMe	Ms	H
	$\text{CH}_2\text{C} \equiv \text{CH}$	Me	Me	CHMeOCOMe	Ms	H
	$\text{CH}_2\text{C} \equiv \text{CH}$	Me	Me	$\text{CH}_2\text{OSO}_2\text{Me}$	Ms	H
	$\text{CH}_2\text{C} \equiv \text{CH}$	Me	Me	$\text{CHMeOSO}_2\text{Me}$	Ms	H
10	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Cl	CH_2OH	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Cl	CH_2OMe	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Cl	CH_2OMe	Cl	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Cl	CH_2OMe	MeS	H
15	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Cl	CH_2OMe	MeSO	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Cl	CH_2OEt	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Cl	CH_2OEt	Cl	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Cl	CH_2OEt	MeS	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Cl	CH_2OEt	MeSO	H
20	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Cl	$\text{CH}_2\text{OPr-i}$	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Cl	$\text{CH}_2\text{OPr-n}$	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Cl	$\text{CH}_2\text{OCH}=\text{CH}_2$	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Cl	$\text{CH}_2\text{OCH}_2\text{CH}=\text{CH}_2$	Ms	H
25	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Cl	$\text{CH}_2\text{OCH}_2\text{C} \equiv \text{CH}$	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Cl	$\text{CH}_2\text{OCH}_2\text{CH}_2\text{Cl}$	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Cl	CHMeOH	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Cl	CHMeOMe	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Cl	CHMeOMe	Cl	H
30	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Cl	CHMeOMe	MeS	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Cl	CHMeOMe	MeSO	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Cl	CHMeOEt	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Cl	$\text{CH}_2\text{CH}_2\text{OMe}$	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Cl	$\text{CH}_2\text{CH}_2\text{OEt}$	Ms	H
35	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Cl	CHEtOH	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Cl	CHEtOMe	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Cl	CHEtOEt	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Cl	$\text{CH}_2\text{OCH}_2\text{CH}_2\text{OMe}$	Ms	H
40	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Cl	CH_2NMe_2	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Cl	$\text{CH}_2\text{OCH}_2\text{Ph}$	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Cl	$\text{CH}_2\text{OCH}_2\text{CO}_2\text{Me}$	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Cl	$\text{CH}_2\text{OCH}_2\text{CO}_2\text{Et}$	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Cl	$\text{CH}_2\text{OCHMeCO}_2\text{Me}$	Ms	H
45	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Cl	CH_2CN	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Cl	CH_2SMe	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Cl	CH_2SEt	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	Cl	$\text{CH}_2\text{SO}_2\text{Me}$	Ms	H

50

55

	A	B	X	Y	Z	Q
5	CH ₂ CH=CH ₂	Me	Cl	CH ₂ SO ₂ Et	Ms	H
	CH ₂ CH=CH ₂	Me	Cl	CH ₂ SCCH ₂ CH ₂ OMe	Ms	H
	CH ₂ CH=CH ₂	Me	Cl	CH ₂ OCOMe	Ms	H
	CH ₂ CH=CH ₂	Me	Cl	CHMeOCOMe	Ms	H
10	CH ₂ CH=CH ₂	Me	Cl	CH ₂ OSO ₂ Me	Ms	H
	CH ₂ CH=CH ₂	Me	Cl	CHMeOSO ₂ Me	Ms	H
	CH ₂ C≡CH	Me	Cl	CH ₂ OH	Ms	H
	CH ₂ C≡CH	Me	Cl	CH ₂ OMe	Ms	H
	CH ₂ C≡CH	Me	Cl	CH ₂ OMe	Cl	H
15	CH ₂ C≡CH	Me	Cl	CH ₂ OMe	MeS	H
	CH ₂ C≡CH	Me	Cl	CH ₂ OMe	MeSO	H
	CH ₂ C≡CH	Me	Cl	CH ₂ OE _t	Ms	H
	CH ₂ C≡CH	Me	Cl	CH ₂ OE _t	Cl	H
20	CH ₂ C≡CH	Me	Cl	CH ₂ OE _t	MeS	H
	CH ₂ C≡CH	Me	Cl	CH ₂ OE _t	MeSO	H
	CH ₂ C≡CH	Me	Cl	CH ₂ OP _r -i	Ms	H
	CH ₂ C≡CH	Me	Cl	CH ₂ OP _r -a	Ms	H
25	CH ₂ C≡CH	Me	Cl	CH ₂ OCH=CH ₂	Ms	H
	CH ₂ C≡CH	Me	Cl	CH ₂ OCH ₂ CH=CH ₂	Ms	H
	CH ₂ C≡CH	Me	Cl	CH ₂ OCH ₂ C≡CH	Ms	H
	CH ₂ C≡CH	Me	Cl	CH ₂ OCH ₂ CH ₂ Cl	Ms	H
	CH ₂ C≡CH	Me	Cl	CHMeOH	Ms	H
30	CH ₂ C≡CH	Me	Cl	CHMeOMe	Ms	H
	CH ₂ C≡CH	Me	Cl	CHMeOMe	Cl	H
	CH ₂ C≡CH	Me	Cl	CHMeOMe	MeS	H
	CH ₂ C≡CH	Me	Cl	CHMeOMe	MeSO	H
	CH ₂ C≡CH	Me	Cl	CHMeOE _t	Ms	H
35	CH ₂ C≡CH	Me	Cl	CH ₂ CH ₂ OMe	Ms	H
	CH ₂ C≡CH	Me	Cl	CH ₂ CH ₂ OE _t	Ms	H
	CH ₂ C≡CH	Me	Cl	CHEtOH	Ms	H
	CH ₂ C≡CH	Me	Cl	CHEtOMe	Ms	H
	CH ₂ C≡CH	Me	Cl	CHEtOE _t	Ms	H
40	CH ₂ C≡CH	Me	Cl	CH ₂ OCH ₂ CH ₂ OMe	Ms	H
	CH ₂ C≡CH	Me	Cl	CH ₂ NMe ₂	Ms	H
	CH ₂ C≡CH	Me	Cl	CH ₂ OCH ₂ Ph	Ms	H
	CH ₂ C≡CH	Me	Cl	CH ₂ OCH ₂ CO ₂ Me	Ms	H
45	CH ₂ C≡CH	Me	Cl	CH ₂ OCH ₂ CO ₂ Et	Ms	H
	CH ₂ C≡CH	Me	Cl	CH ₂ OCHMeCO ₂ Me	Ms	H
	CH ₂ C≡CH	Me	Cl	CH ₂ CN	Ms	H
	CH ₂ C≡CH	Me	Cl	CH ₂ SMe	Ms	H

50

55

	A	B	X	Y	Z	Q
5	$\text{CH}_2\text{C} \equiv \text{CH}$	Me	Cl	CH_2SEt	Ms	H
	$\text{CH}_2\text{C} \equiv \text{CH}$	Me	Cl	$\text{CH}_2\text{SO}_2\text{Me}$	Ms	H
	$\text{CH}_2\text{C} \equiv \text{CH}$	Me	Cl	$\text{CH}_2\text{SO}_2\text{Et}$	Ms	H
	$\text{CH}_2\text{C} \equiv \text{CH}$	Me	Cl	$\text{CH}_2\text{SCH}_2\text{CH}_2\text{OMe}$	Ms	H
10	$\text{CH}_2\text{C} \equiv \text{CH}$	Me	Cl	CH_2OCOMe	Ms	H
	$\text{CH}_2\text{C} \equiv \text{CH}$	Me	Cl	CHMeOCOMe	Ms	H
	$\text{CH}_2\text{C} \equiv \text{CH}$	Me	Cl	$\text{CH}_2\text{OSO}_2\text{Me}$	Ms	H
	$\text{CH}_2\text{C} \equiv \text{CH}$	Me	Cl	$\text{CHMeOSO}_2\text{Me}$	Ms	H
15	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	MeO	CH_2OH	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	MeO	CH_2OMe	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	MeO	CH_2OMe	Cl	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	MeO	CH_2OMe	MeS	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	MeO	CH_2OMe	MeSO	H
20	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	MeO	CH_2OEt	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	MeO	CH_2OEt	Cl	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	MeO	CH_2OEt	MeS	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	MeO	CH_2OEt	MeSO	H
25	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	MeO	$\text{CH}_2\text{OPr-i}$	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	MeO	$\text{CH}_2\text{OPr-n}$	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	MeO	$\text{CH}_2\text{OCH}=\text{CH}_2$	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	MeO	$\text{CH}_2\text{OCH}_2\text{CH}=\text{CH}_2$	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	MeO	$\text{CH}_2\text{OCH}_2\text{C} \equiv \text{CH}$	Ms	H
30	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	MeO	$\text{CH}_2\text{OCH}_2\text{CH}_2\text{Cl}$	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	MeO	CHMeOH	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	MeO	CHMeOMe	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	MeO	CHMeOMe	Cl	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	MeO	CHMeOMe	MeS	H
35	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	MeO	CHMeOMe	MeSO	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	MeO	CHMeOEt	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	MeO	$\text{CH}_2\text{CH}_2\text{OMe}$	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	MeO	$\text{CH}_2\text{CH}_2\text{OEt}$	Ms	H
40	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	MeO	CHEtOH	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	MeO	CHEtOMe	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	MeO	CHEtOEt	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	MeO	$\text{CH}_2\text{OCH}_2\text{CH}_2\text{OMe}$	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	MeO	CH_2NMe_2	Ms	H
45	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	MeO	$\text{CH}_2\text{OCH}_2\text{Ph}$	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	MeO	$\text{CH}_2\text{OCH}_2\text{CO}_2\text{Me}$	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	MeO	$\text{CH}_2\text{OCH}_2\text{CO}_2\text{Et}$	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	MeO	$\text{CH}_2\text{OCHMeCO}_2\text{Me}$	Ms	H

50

55

	A	B	X	Y	Z	Q
5	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	MeO	CH_2CN	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	MeO	CH_2SMe	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	MeO	CH_2SEt	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	MeO	$\text{CH}_2\text{SO}_2\text{Me}$	Ms	H
10	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	MeO	$\text{CH}_2\text{SO}_2\text{Et}$	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	MeO	$\text{CH}_2\text{SCH}_2\text{CH}_2\text{OMe}$	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	MeO	CH_2OCOMe	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	MeO	CHMeOCOMe	Ms	H
15	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	MeO	$\text{CH}_2\text{OSO}_2\text{Me}$	Ms	H
	$\text{CH}_2\text{CH}=\text{CH}_2$	Me	MeO	$\text{CHMeOSO}_2\text{Me}$	Ms	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	Me	MeO	CH_2OH	Ms	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	Me	MeO	CH_2OMe	Ms	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	Me	MeO	CH_2OMe	Cl	H
20	$\text{CH}_2\text{C}\equiv\text{CH}$	Me	MeO	CH_2OMe	MeS	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	Me	MeO	CH_2OMe	MeSO	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	Me	MeO	CH_2OEt	Ms	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	Me	MeO	CH_2OEt	Cl	H
25	$\text{CH}_2\text{C}\equiv\text{CH}$	Me	MeO	CH_2OEt	MeS	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	Me	MeO	CH_2OEt	MeSO	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	Me	MeO	$\text{CH}_2\text{OPr-i}$	Ms	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	Me	MeO	$\text{CH}_2\text{OPr-n}$	Ms	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	Me	MeO	$\text{CH}_2\text{OCH}=\text{CH}_2$	Ms	H
30	$\text{CH}_2\text{C}\equiv\text{CH}$	Me	MeO	$\text{CH}_2\text{OCH}_2\text{CH}=\text{CH}_2$	Ms	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	Me	MeO	$\text{CH}_2\text{OCH}_2\text{C}\equiv\text{CH}$	Ms	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	Me	MeO	$\text{CH}_2\text{OCH}_2\text{CH}_2\text{Cl}$	Ms	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	Me	MeO	CHMeOH	Ms	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	Me	MeO	CHMeOMe	Ms	H
35	$\text{CH}_2\text{C}\equiv\text{CH}$	Me	MeO	CHMeOMe	Cl	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	Me	MeO	CHMeOMe	MeS	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	Me	MeO	CHMeOMe	MeSO	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	Me	MeO	CHMeOEt	Ms	H
40	$\text{CH}_2\text{C}\equiv\text{CH}$	Me	MeO	$\text{CH}_2\text{CH}_2\text{OMe}$	Ms	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	Me	MeO	$\text{CH}_2\text{CH}_2\text{OEt}$	Ms	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	Me	MeO	CHEtOH	Ms	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	Me	MeO	CHEtOMe	Ms	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	Me	MeO	CHEtOEt	Ms	H
45	$\text{CH}_2\text{C}\equiv\text{CH}$	Me	MeO	$\text{CH}_2\text{OCH}_2\text{CH}_2\text{OMe}$	Ms	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	Me	MeO	CH_2NMe_2	Ms	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	Me	MeO	$\text{CH}_2\text{OCH}_2\text{Ph}$	Ms	H
	$\text{CH}_2\text{C}\equiv\text{CH}$	Me	MeO	$\text{CH}_2\text{OCH}_2\text{CO}_2\text{Me}$	Ms	H

50

55

	A	E	X	Y	Z	Q
5	CH ₂ C ≡ CH	Me	MeO	CH ₂ OCH ₂ CO ₂ Et	Ms	H
	CH ₂ C ≡ CH	Me	MeO	CH ₂ OCHMeCO ₂ Me	Ms	H
	CH ₂ C ≡ CH	Me	MeO	CH ₂ CN	Ms	H
	CH ₂ C ≡ CH	Me	MeO	CH ₂ SMe	Ms	H
	CH ₂ C ≡ CH	Me	MeO	CH ₂ SEt	Ms	H
10	CH ₂ C ≡ CH	Me	MeO	CH ₂ SO ₂ Me	Ms	H
	CH ₂ C ≡ CH	Me	MeO	CH ₂ SO ₂ Et	Ms	H
	CH ₂ C ≡ CH	Me	MeO	CH ₂ SCH ₂ CH ₂ OMe	Ms	H
	CH ₂ C ≡ CH	Me	MeO	CH ₂ OCOMe	Ms	H
15	CH ₂ C ≡ CH	Me	MeO	CHMeOCOMe	Ms	H
	CH ₂ C ≡ CH	Me	MeO	CH ₂ OSO ₂ Me	Ms	H
	CH ₂ C ≡ CH	Me	Me	CHMeOSO ₂ Me	Ms	H

20

25

30

35

40

45

50

55

	A	E	X	Y	Z	Q
5	Me	CF ₃	Me	CH ₂ OMe	Ms	H
	Me	CF ₃	Me	CH ₂ OE t	Ms	H
	Me	CF ₃	Me	CHMeOMe	Ms	H
	Me	CF ₃	Me	CHMeOE t	Ms	H
10	Me	CF ₃	Me	CH ₂ CH ₂ OMe	Ms	H
	Me	CF ₃	Me	CH ₂ CH ₂ OE t	Ms	H
	Me	CF ₃	Me	CHEtOMe	Ms	H
	Me	CF ₃	Me	CHEtOE t	Ms	H
15	Me	CF ₃	Me	CH ₂ OCH ₂ CO ₂ Me	Ms	H
	Me	CF ₃	Me	CH ₂ SMe	Ms	H
	Me	CF ₃	Me	CH ₂ SE t	Ms	H
	Me	CF ₃	Me	CH ₂ SO ₂ Me	Ms	H
20	Me	CF ₃	Me	CH ₂ OCOMe	Ms	H
	Me	CF ₃	Me	CHMeOCOMe	Ms	H
	Me	CF ₃	Me	CH ₂ OSO ₂ Me	Ms	H
	Me	CF ₃	Me	CHMeOSO ₂ Me	Ms	H
	Et	CF ₃	Me	CH ₂ OMe	Ms	H
25	Et	CF ₃	Me	CH ₂ OE t	Ms	H
	Et	CF ₃	Me	CHMeOMe	Ms	H
	Et	CF ₃	Me	CHMeOE t	Ms	H
	Et	CF ₃	Me	CH ₂ CH ₂ OMe	Ms	H
	Et	CF ₃	Me	CH ₂ CH ₂ OE t	Ms	H
30	Et	CF ₃	Me	CHEtOMe	Ms	H
	Et	CF ₃	Me	CHEtOE t	Ms	H
	Et	CF ₃	Me	CH ₂ OCH ₂ CO ₂ Me	Ms	H
	Et	CF ₃	Me	CH ₂ SMe	Ms	H
35	Et	CF ₃	Me	CH ₂ SE t	Ms	H
	Et	CF ₃	Me	CH ₂ SO ₂ Me	Ms	H
	Et	CF ₃	Me	CH ₂ OCOMe	Ms	H
	Et	CF ₃	Me	CHMeOCOMe	Ms	H
	Et	CF ₃	Me	CH ₂ OSO ₂ Me	Ms	H
40	Et	CF ₃	Me	CHMeOSO ₂ Me	Ms	H
	Pr-i	CF ₃	Me	CH ₂ OMe	Ms	H
	Pr-i	CF ₃	Me	CH ₂ OE t	Ms	H
	Pr-i	CF ₃	Me	CHMeOMe	Ms	H
	Pr-i	CF ₃	Me	CHMeOE t	Ms	H
45	Pr-i	CF ₃	Me	CH ₂ CH ₂ OMe	Ms	H
	Pr-i	CF ₃	Me	CH ₂ CH ₂ OE t	Ms	H
	Pr-i	CF ₃	Me	CHEtOMe	Ms	H
	Pr-i	CF ₃	Me	CHEtOE t	Ms	H

50

55

	A	B	X	Y	Z	Q
5	Pr-i	CF ₃	Me	CH ₂ OCH ₂ CO ₂ Me	Ms	H
	Pr-i	CF ₃	Me	CH ₂ SMe	Ms	H
	Pr-i	CF ₃	Me	CH ₂ SEt	Ms	H
10	Pr-i	CF ₃	Me	CH ₂ SO ₂ Me	Ms	H
	Pr-i	CF ₃	Me	CH ₂ OCOMe	Ms	H
	Pr-i	CF ₃	Me	CHMeOCOMe	Ms	H
	Pr-i	CF ₃	Me	CH ₂ OSO ₂ Me	Ms	H
	Pr-i	CF ₃	Me	CHMeOSO ₂ Me	Ms	H
15	Me	CF ₃	Cl	CH ₂ OMe	Ms	H
	Me	CF ₃	Cl	CH ₂ OEt	Ms	H
	Me	CF ₃	Cl	CHMeOMe	Ms	H
	Me	CF ₃	Cl	CHMeOEt	Ms	H
20	Me	CF ₃	Cl	CH ₂ CH ₂ OMe	Ms	H
	Me	CF ₃	Cl	CH ₂ CH ₂ OEt	Ms	H
	Me	CF ₃	Cl	CHEtOMe	Ms	H
	Me	CF ₃	Cl	CHEtOEt	Ms	H
	Me	CF ₃	Cl	CH ₂ OCH ₂ CO ₂ Me	Ms	H
25	Me	CF ₃	Cl	CH ₂ SMe	Ms	H
	Me	CF ₃	Cl	CH ₂ SEt	Ms	H
	Me	CF ₃	Cl	CH ₂ SO ₂ Me	Ms	H
	Me	CF ₃	Cl	CH ₂ OCOMe	Ms	H
	Me	CF ₃	Cl	CHMeOCOMe	Ms	H
30	Me	CF ₃	Cl	CH ₂ OSO ₂ Me	Ms	H
	Me	CF ₃	Cl	CHMeOSO ₂ Me	Ms	H
	Et	CF ₃	Cl	CH ₂ OMe	Ms	H
	Et	CF ₃	Cl	CH ₂ OEt	Ms	H
35	Et	CF ₃	Cl	CHMeOMe	Ms	H
	Et	CF ₃	Cl	CHMeOEt	Ms	H
	Et	CF ₃	Cl	CH ₂ CH ₂ OMe	Ms	H
	Et	CF ₃	Cl	CH ₂ CH ₂ OEt	Ms	H
	Et	CF ₃	Cl	CHEtOMe	Ms	H
40	Et	CF ₃	Cl	CHEtOEt	Ms	H
	Et	CF ₃	Cl	CH ₂ OCH ₂ CO ₂ Me	Ms	H
	Et	CF ₃	Cl	CH ₂ SMe	Ms	H
	Et	CF ₃	Cl	CH ₂ SEt	Ms	H
	Et	CF ₃	Cl	CH ₂ SO ₂ Me	Ms	H
45	Et	CF ₃	Cl	CH ₂ OCOMe	Ms	H
	Et	CF ₃	Cl	CHMeOCOMe	Ms	H
	Et	CF ₃	Cl	CH ₂ OSO ₂ Me	Ms	H
	Et	CF ₃	Cl	CHMeOSO ₂ Me	Ms	H

50

55

	A	E	X	Y	Z	Q
5	Pr-i	CF ₃	Cl	CH ₂ OMe	Ms	H
	Pr-i	CF ₃	Cl	CH ₂ OE t	Ms	H
	Pr-i	CF ₃	Cl	CHMeOMe	Ms	H
	Pr-i	CF ₃	Cl	CHMeOE t	Ms	H
10	Pr-i	CF ₃	Cl	CH ₂ CH ₂ OMe	Ms	H
	Pr-i	CF ₃	Cl	CH ₂ CH ₂ OE t	Ms	H
	Pr-i	CF ₃	Cl	CHEtOMe	Ms	H
	Pr-i	CF ₃	Cl	CHEtOE t	Ms	H
15	Pr-i	CF ₃	Cl	CH ₂ OCH ₂ CO ₂ Me	Ms	H
	Pr-i	CF ₃	Cl	CH ₂ SMe	Ms	H
	Pr-i	CF ₃	Cl	CH ₂ SE t	Ms	H
	Pr-i	CF ₃	Cl	CH ₂ SO ₂ Me	Ms	H
	Pr-i	CF ₃	Cl	CH ₂ OCOMe	Ms	H
20	Pr-i	CF ₃	Cl	CHMeOCOMe	Ms	H
	Pr-i	CF ₃	Cl	CH ₂ OSO ₂ Me	Ms	H
	Pr-i	CF ₃	Cl	CHMeOSO ₂ Me	Ms	H
	Me	Et	Me	CH ₂ OMe	Ms	H
	Me	Et	Me	CH ₂ OE t	Ms	H
25	Me	Et	Me	CHMeOMe	Ms	H
	Me	Et	Me	CHMeOE t	Ms	H
	Me	Et	Me	CH ₂ CH ₂ OMe	Ms	H
	Me	Et	Me	CH ₂ CH ₂ OE t	Ms	H
30	Me	Et	Me	CHEtOMe	Ms	H
	Me	Et	Me	CHEtOE t	Ms	H
	Me	Et	Me	CH ₂ OCH ₂ CO ₂ Me	Ms	H
	Me	Et	Me	CH ₂ SMe	Ms	H
	Me	Et	Me	CH ₂ SE t	Ms	H
35	Me	Et	Me	CH ₂ SO ₂ Me	Ms	H
	Me	Et	Me	CH ₂ OCOMe	Ms	H
	Me	Et	Me	CHMeOCOMe	Ms	H
	Me	Et	Me	CH ₂ OSO ₂ Me	Ms	H
40	Me	Et	Me	CHMeOSO ₂ Me	Ms	H
	Et	Et	Me	CH ₂ OMe	Ms	H
	Et	Et	Me	CH ₂ OE t	Ms	H
	Et	Et	Me	CHMeOMe	Ms	H
	Et	Et	Me	CHMeOE t	Ms	H
45	Et	Et	Me	CH ₂ CH ₂ OMe	Ms	H
	Et	Et	Me	CH ₂ CH ₂ OE t	Ms	H
	Et	Et	Me	CHEtOMe	Ms	H
	Et	Et	Me	CHEtOE t	Ms	H

50

55

	A	B	X	Y	Z	Q
5	Et	Et	Me	CH ₂ OCH ₂ CO ₂ Me	Ms	H
	Et	Et	Me	CH ₂ SMe	Ms	H
	Et	Et	Me	CH ₂ SEt	Ms	H
10	Et	Et	Me	CH ₂ SO ₂ Me	Ms	H
	Et	Et	Me	CH ₂ OCOMe	Ms	H
	Et	Et	Me	CHMeOCOMe	Ms	H
	Et	Et	Me	CH ₂ OSO ₂ Me	Ms	H
	Et	Et	Me	CHMeOSO ₂ Me	Ms	H
15	Pr-i	Et	Me	CH ₂ OMe	Ms	H
	Pr-i	Et	Me	CH ₂ OEt	Ms	H
	Pr-i	Et	Me	CHMeOMe	Ms	H
	Pr-i	Et	Me	CHMeOEt	Ms	H
20	Pr-i	Et	Me	CH ₂ CH ₂ OMe	Ms	H
	Pr-i	Et	Me	CH ₂ CH ₂ OEt	Ms	H
	Pr-i	Et	Me	CHEtOMe	Ms	H
	Pr-i	Et	Me	CHEtOEt	Ms	H
	Pr-i	Et	Me	CH ₂ OCH ₂ CO ₂ Me	Ms	H
25	Pr-i	Et	Me	CH ₂ SMe	Ms	H
	Pr-i	Et	Me	CH ₂ SEt	Ms	H
	Pr-i	Et	Me	CH ₂ SO ₂ Me	Ms	H
	Pr-i	Et	Me	CH ₂ OCOMe	Ms	H
	Pr-i	Et	Me	CHMeOCOMe	Ms	H
30	Pr-i	Et	Me	CH ₂ OSO ₂ Me	Ms	H
	Pr-i	Et	Me	CHMeOSO ₂ Me	Ms	H
	Me	Et	Cl	CH ₂ OMe	Ms	H
	Me	Et	Cl	CH ₂ OEt	Ms	H
35	Me	Et	Cl	CHMeOMe	Ms	H
	Me	Et	Cl	CHMeOEt	Ms	H
	Me	Et	Cl	CH ₂ CH ₂ OMe	Ms	H
	Me	Et	Cl	CH ₂ CH ₂ OEt	Ms	H
	Me	Et	Cl	CHEtOMe	Ms	H
40	Me	Et	Cl	CHEtOEt	Ms	H
	Me	Et	Cl	CH ₂ OCH ₂ CO ₂ Me	Ms	H
	Me	Et	Cl	CH ₂ SMe	Ms	H
	Me	Et	Cl	CH ₂ SEt	Ms	H
	Me	Et	Cl	CH ₂ SO ₂ Me	Ms	H
45	Me	Et	Cl	CH ₂ OCOMe	Ms	H
	Me	Et	Cl	CHMeOCOMe	Ms	H
	Me	Et	Cl	CH ₂ OSO ₂ Me	Ms	H
	Me	Et	Cl	CHMeOSO ₂ Me	Ms	H

50

55

	A	B	X	Y	Z	Q
5	Et	Et	Cl	CH ₂ OMe	Ms	H
	Et	Et	Cl	CH ₂ OEt	Ms	H
	Et	Et	Cl	CHMeOMe	Ms	H
	Et	Et	Cl	CHMeOEt	Ms	H
10	Et	Et	Cl	CH ₂ CH ₂ OMe	Ms	H
	Et	Et	Cl	CH ₂ CH ₂ OEt	Ms	H
	Et	Et	Cl	CHEtOMe	Ms	H
	Et	Et	Cl	CHEtOEt	Ms	H
15	Et	Et	Cl	CH ₂ OCH ₂ CO ₂ Me	Ms	H
	Et	Et	Cl	CH ₂ SMe	Ms	H
	Et	Et	Cl	CH ₂ SEt	Ms	H
	Et	Et	Cl	CH ₂ SO ₂ Me	Ms	H
20	Et	Et	Cl	CH ₂ OCOMe	Ms	H
	Et	Et	Cl	CHMeOCOMe	Ms	H
	Et	Et	Cl	CH ₂ OSO ₂ Me	Ms	H
	Et	Et	Cl	CHMeOSO ₂ Me	Ms	H
	Pr-i	Et	Cl	CH ₂ OMe	Ms	H
25	Pr-i	Et	Cl	CH ₂ OEt	Ms	H
	Pr-i	Et	Cl	CHMeOMe	Ms	H
	Pr-i	Et	Cl	CHMeOEt	Ms	H
	Pr-i	Et	Cl	CH ₂ CH ₂ OMe	Ms	H
	Pr-i	Et	Cl	CH ₂ CH ₂ OEt	Ms	H
30	Pr-i	Et	Cl	CHEtOMe	Ms	H
	Pr-i	Et	Cl	CHEtOEt	Ms	H
	Pr-i	Et	Cl	CH ₂ OCH ₂ CO ₂ Me	Ms	H
	Pr-i	Et	Cl	CH ₂ SMe	Ms	H
	Pr-i	Et	Cl	CH ₂ SEt	Ms	H
35	Pr-i	Et	Cl	CH ₂ SO ₂ Me	Ms	H
	Pr-i	Et	Cl	CH ₂ OCOMe	Ms	H
	Pr-i	Et	Cl	CHMeOCOMe	Ms	H
	Pr-i	Et	Cl	CH ₂ OSO ₂ Me	Ms	H
40	Pr-i	Et	Cl	CHMeOSO ₂ Me	Ms	H
	Me	CH ₂ OMe	Me	CH ₂ OMe	Ms	H
	Me	CH ₂ OMe	Me	CH ₂ OEt	Ms	H
	Me	CH ₂ OMe	Me	CHMeOMe	Ms	H
	Me	CH ₂ OMe	Me	CHMeOEt	Ms	H
45	Me	CH ₂ OMe	Me	CH ₂ CH ₂ OMe	Ms	H
	Me	CH ₂ OMe	Me	CH ₂ CH ₂ OEt	Ms	H
	Me	CH ₂ OMe	Me	CHEtOMe	Ms	H
	Me	CH ₂ OMe	Me	CHEtOEt	Ms	H

50

55

	A	B	X	Y	Z	Q
5	Me	CH ₂ OMe	Me	CH ₂ OCH ₂ CO ₂ Me	Ms	H
	Me	CH ₂ OMe	Me	CH ₂ SMe	Ms	H
	Me	CH ₂ OMe	Me	CH ₂ SEt	Ms	H
	Me	CH ₂ OMe	Me	CH ₂ SO ₂ Me	Ms	H
10	Me	CH ₂ OMe	Me	CH ₂ OCOMe	Ms	H
	Me	CH ₂ OMe	Me	CHMeOCOMe	Ms	H
	Me	CH ₂ OMe	Me	CH ₂ OSO ₂ Me	Ms	H
	Me	CH ₂ OMe	Me	CHMeOSO ₂ Me	Ms	H
15	Et	CH ₂ OMe	Me	CH ₂ OMe	Ms	H
	Et	CH ₂ OMe	Me	CH ₂ OEt	Ms	H
	Et	CH ₂ OMe	Me	CHMeOMe	Ms	H
	Et	CH ₂ OMe	Me	CHMeOEt	Ms	H
	Et	CH ₂ OMe	Me	CH ₂ CH ₂ OMe	Ms	H
20	Et	CH ₂ OMe	Me	CH ₂ CH ₂ OEt	Ms	H
	Et	CH ₂ OMe	Me	CHEtOMe	Ms	H
	Et	CH ₂ OMe	Me	CHEtOEt	Ms	H
	Et	CH ₂ OMe	Me	CH ₂ OCH ₂ CO ₂ Me	Ms	H
25	Et	CH ₂ OMe	Me	CH ₂ SMe	Ms	H
	Et	CH ₂ OMe	Me	CH ₂ SEt	Ms	H
	Et	CH ₂ OMe	Me	CH ₂ SO ₂ Me	Ms	H
	Et	CH ₂ OMe	Me	CH ₂ OCOMe	Ms	H
	Et	CH ₂ OMe	Me	CHMeOCOMe	Ms	H
30	Et	CH ₂ OMe	Me	CH ₂ OSO ₂ Me	Ms	H
	Et	CH ₂ OMe	Me	CHMeOSO ₂ Me	Ms	H
	Pr-i	CH ₂ OMe	Me	CH ₂ OMe	Ms	H
	Pr-i	CH ₂ OMe	Me	CH ₂ OEt	Ms	H
	Pr-i	CH ₂ OMe	Me	CHMeOMe	Ms	H
35	Pr-i	CH ₂ OMe	Me	CHMeOEt	Ms	H
	Pr-i	CH ₂ OMe	Me	CH ₂ CH ₂ OMe	Ms	H
	Pr-i	CH ₂ OMe	Me	CH ₂ CH ₂ OEt	Ms	H
	Pr-i	CH ₂ OMe	Me	CHEtOMe	Ms	H
	Pr-i	CH ₂ OMe	Me	CHEtOEt	Ms	H
40	Pr-i	CH ₂ OMe	Me	CH ₂ OCH ₂ CO ₂ Me	Ms	H
	Pr-i	CH ₂ OMe	Me	CH ₂ SMe	Ms	H
	Pr-i	CH ₂ OMe	Me	CH ₂ SEt	Ms	H
	Pr-i	CH ₂ OMe	Me	CH ₂ SO ₂ Me	Ms	H
45	Pr-i	CH ₂ OMe	Me	CH ₂ OCOMe	Ms	H
	Pr-i	CH ₂ OMe	Me	CHMeOCOMe	Ms	H
	Pr-i	CH ₂ OMe	Me	CH ₂ OSO ₂ Me	Ms	H
	Pr-i	CH ₂ OMe	Me	CHMeOSO ₂ Me	Ms	H
50						
55						

	A	B	X	Y	Z	Q
5	Me	CH ₂ OMe	Cl	CH ₂ OMe	Ms	H
	Me	CH ₂ OMe	Cl	CH ₂ OEt	Ms	H
	Me	CH ₂ OMe	Cl	CHMeOMe	Ms	H
	Me	CH ₂ OMe	Cl	CHMeOEt	Ms	H
10	Me	CH ₂ OMe	Cl	CH ₂ CH ₂ OMe	Ms	H
	Me	CH ₂ OMe	Cl	CH ₂ CH ₂ OEt	Ms	H
	Me	CH ₂ OMe	Cl	CHEtOMe	Ms	H
	Me	CH ₂ OMe	Cl	CHEtOEt	Ms	H
15	Me	CH ₂ OMe	Cl	CH ₂ OCH ₂ CO ₂ Me	Ms	H
	Me	CH ₂ OMe	Cl	CH ₂ SMc	Ms	H
	Me	CH ₂ OMe	Cl	CH ₂ SEt	Ms	H
	Me	CH ₂ OMe	Cl	CH ₂ SO ₂ Me	Ms	H
	Me	CH ₂ OMe	Cl	CH ₂ OCOMe	Ms	H
20	Me	CH ₂ OMe	Cl	CHMeOCOMe	Ms	H
	Me	CH ₂ OMe	Cl	CH ₂ OSO ₂ Me	Ms	H
	Me	CH ₂ OMe	Cl	CHMeOSO ₂ Me	Ms	H
	Et	CH ₂ OMe	Cl	CH ₂ OMe	Ms	H
25	Et	CH ₂ OMe	Cl	CH ₂ OEt	Ms	H
	Et	CH ₂ OMe	Cl	CHMeOMe	Ms	H
	Et	CH ₂ OMe	Cl	CHMeOEt	Ms	H
	Et	CH ₂ OMe	Cl	CH ₂ CH ₂ OMe	Ms	H
	Et	CH ₂ OMe	Cl	CH ₂ CH ₂ OEt	Ms	H
30	Et	CH ₂ OMe	Cl	CHEtOMe	Ms	H
	Et	CH ₂ OMe	Cl	CHEtOEt	Ms	H
	Et	CH ₂ OMe	Cl	CH ₂ OCH ₂ CO ₂ Me	Ms	H
	Et	CH ₂ OMe	Cl	CH ₂ SMc	Ms	H
	Et	CH ₂ OMe	Cl	CH ₂ SEt	Ms	H
35	Et	CH ₂ OMe	Cl	CH ₂ SO ₂ Me	Ms	H
	Et	CH ₂ OMe	Cl	CH ₂ OCOMe	Ms	H
	Et	CH ₂ OMe	Cl	CHMeOCOMe	Ms	H
	Et	CH ₂ OMe	Cl	CH ₂ OSO ₂ Me	Ms	H
	Et	CH ₂ OMe	Cl	CHMeOSO ₂ Me	Ms	H
40	Pr-i	CH ₂ OMe	Cl	CH ₂ OMe	Ms	H
	Pr-i	CH ₂ OMe	Cl	CH ₂ OEt	Ms	H
	Pr-i	CH ₂ OMe	Cl	CHMeOMe	Ms	H
	Pr-i	CH ₂ OMe	Cl	CHMeOEt	Ms	H
45	Pr-i	CH ₂ OMe	Cl	CH ₂ CH ₂ OMe	Ms	H
	Pr-i	CH ₂ OMe	Cl	CH ₂ CH ₂ OEt	Ms	H
	Pr-i	CH ₂ OMe	Cl	CHEtOMe	Ms	H
	Pr-i	CH ₂ OMe	Cl	CHEtOEt	Ms	H

50

55

	A	E	X	Y	Z	Q
5	Pr-i	CH ₂ OMe	Cl	CH ₂ OCH ₂ CO ₂ Me	Ms	H
	Pr-i	CH ₂ OMe	Cl	CH ₂ SMe	Ms	H
	Pr-i	CH ₂ OMe	Cl	CH ₂ SEt	Ms	H
10	Pr-i	CH ₂ OMe	Cl	CH ₂ SO ₂ Me	Ms	H
	Pr-i	CH ₂ OMe	Cl	CH ₂ OCOMe	Ms	H
	Pr-i	CH ₂ OMe	Cl	CHMeOCOMe	Ms	H
	Pr-i	CH ₂ OMe	Cl	CH ₂ OSO ₂ Me	Ms	H
	Pr-i	CH ₂ OMe	Cl	CHMeOSO ₂ Me	Ms	H
15	Me	OMe	Me	CH ₂ OMe	Ms	H
	Me	OMe	Me	CH ₂ OEt	Ms	H
	Me	OMe	Me	CHMeOMe	Ms	H
	Me	OMe	Me	CHMeOEt	Ms	H
20	Me	OMe	Me	CH ₂ CH ₂ OMe	Ms	H
	Me	OMe	Me	CH ₂ CH ₂ OEt	Ms	H
	Me	OMe	Me	CHEtOMe	Ms	H
	Me	OMe	Me	CHEtOEt	Ms	H
	Me	OMe	Me	CH ₂ OCH ₂ CO ₂ Me	Ms	H
25	Me	OMe	Me	CH ₂ SMe	Ms	H
	Me	OMe	Me	CH ₂ SEt	Ms	H
	Me	OMe	Me	CH ₂ SO ₂ Me	Ms	H
	Me	OMe	Me	CH ₂ OCOMe	Ms	H
	Me	OMe	Me	CHMeOCOMe	Ms	H
30	Me	OMe	Me	CH ₂ OSO ₂ Me	Ms	H
	Me	OMe	Me	CHMeOSO ₂ Me	Ms	H
	Et	OMe	Me	CH ₂ OMe	Ms	H
	Et	OMe	Me	CH ₂ OEt	Ms	H
35	Et	OMe	Me	CHMeOMe	Ms	H
	Et	OMe	Me	CHMeOEt	Ms	H
	Et	OMe	Me	CH ₂ CH ₂ OMe	Ms	H
	Et	OMe	Me	CH ₂ CH ₂ OEt	Ms	H
	Et	OMe	Me	CHEtOMe	Ms	H
40	Et	OMe	Me	CHEtOEt	Ms	H
	Et	OMe	Me	CH ₂ OCH ₂ CO ₂ Me	Ms	H
	Et	OMe	Me	CH ₂ SMe	Ms	H
	Et	OMe	Me	CH ₂ SEt	Ms	H
	Et	OMe	Me	CH ₂ SO ₂ Me	Ms	H
45	Et	OMe	Me	CH ₂ OCOMe	Ms	H
	Et	OMe	Me	CHMeOCOMe	Ms	H
	Et	OMe	Me	CH ₂ OSO ₂ Me	Ms	H
	Et	OMe	Me	CHMeOSO ₂ Me	Ms	H
50						
55						

	A	E	X	Y	Z	Q
5	Pr-i	OMe	Me	CH ₂ OMe	Ms	H
	Pr-i	OMe	Me	CH ₂ OEt	Ms	H
	Pr-i	OMe	Me	CHMeOMe	Ms	H
	Pr-i	OMe	Me	CHMeOEt	Ms	H
10	Pr-i	OMe	Me	CH ₂ CH ₂ OMe	Ms	H
	Pr-i	OMe	Me	CH ₂ CH ₂ OEt	Ms	H
	Pr-i	OMe	Me	CHEtOMe	Ms	H
	Pr-i	OMe	Me	CHEtOEt	Ms	H
15	Pr-i	OMe	Me	CH ₂ OCH ₂ CO ₂ Me	Ms	H
	Pr-i	OMe	Me	CH ₂ SMe	Ms	H
	Pr-i	OMe	Me	CH ₂ SEt	Ms	H
	Pr-i	OMe	Me	CH ₂ SO ₂ Me	Ms	H
	Pr-i	OMe	Me	CH ₂ OCOMe	Ms	H
20	Pr-i	OMe	Me	CHMeOCOMe	Ms	H
	Pr-i	OMe	Me	CH ₂ OSO ₂ Me	Ms	H
	Pr-i	OMe	Me	CHMeOSO ₂ Me	Ms	H
	Me	OMe	Cl	CH ₂ OMe	Ms	H
25	Me	OMe	Cl	CH ₂ OEt	Ms	H
	Me	OMe	Cl	CHMeOMe	Ms	H
	Me	OMe	Cl	CHMeOEt	Ms	H
	Me	OMe	Cl	CH ₂ CH ₂ OMe	Ms	H
	Me	OMe	Cl	CH ₂ CH ₂ OEt	Ms	H
30	Me	OMe	Cl	CHEtOMe	Ms	H
	Me	OMe	Cl	CHEtOEt	Ms	H
	Me	OMe	Cl	CH ₂ OCH ₂ CO ₂ Me	Ms	H
	Me	OMe	Cl	CH ₂ SMe	Ms	H
	Me	OMe	Cl	CH ₂ SEt	Ms	H
35	Me	OMe	Cl	CH ₂ SO ₂ Me	Ms	H
	Me	OMe	Cl	CH ₂ OCOMe	Ms	H
	Me	OMe	Cl	CHMeOCOMe	Ms	H
	Me	OMe	Cl	CH ₂ OSO ₂ Me	Ms	H
	Me	OMe	Cl	CHMeOSO ₂ Me	Ms	H
40	Et	OMe	Cl	CH ₂ OMe	Ms	H
	Et	OMe	Cl	CH ₂ OEt	Ms	H
	Et	OMe	Cl	CHMeOMe	Ms	H
	Et	OMe	Cl	CHMeOEt	Ms	H
45	Et	OMe	Cl	CH ₂ CH ₂ OMe	Ms	H
	Et	OMe	Cl	CH ₂ CH ₂ OEt	Ms	H
	Et	OMe	Cl	CHEtOMe	Ms	H
	Et	OMe	Cl	CHEtOEt	Ms	H

50

55

	A	B	X	Y	Z	Q
5	Et	OMe	Cl	CH ₂ OCH ₂ CO ₂ Me	Ms	H
	Et	OMe	Cl	CH ₂ SMe	Ms	H
	Et	OMe	Cl	CH ₂ SEt	Ms	H
	Et	OMe	Cl	CH ₂ SO ₂ Me	Ms	H
10	Et	OMe	Cl	CH ₂ OCOMe	Ms	H
	Et	OMe	Cl	CHMeOCOMe	Ms	H
	Et	OMe	Cl	CH ₂ OSO ₂ Me	Ms	H
	Et	OMe	Cl	CHMeOSO ₂ Me	Ms	H
	Pr-i	OMe	Cl	CH ₂ OMe	Ms	H
15	Pr-i	OMe	Cl	CH ₂ OEt	Ms	H
	Pr-i	OMe	Cl	CHMeOMe	Ms	H
	Pr-i	OMe	Cl	CHMeOEt	Ms	H
	Pr-i	OMe	Cl	CH ₂ CH ₂ OMe	Ms	H
20	Pr-i	OMe	Cl	CH ₂ CH ₂ OEt	Ms	H
	Pr-i	OMe	Cl	CHEtOMe	Ms	H
	Pr-i	OMe	Cl	CHEtOEt	Ms	H
	Pr-i	OMe	Cl	CH ₂ OCH ₂ CO ₂ Me	Ms	H
	Pr-i	OMe	Cl	CH ₂ SMe	Ms	H
25	Pr-i	OMe	Cl	CH ₂ SEt	Ms	H
	Pr-i	OMe	Cl	CH ₂ SO ₂ Me	Ms	H
	Pr-i	OMe	Cl	CH ₂ OCOMe	Ms	H
	Pr-i	OMe	Cl	CHMeOCOMe	Ms	H
	Pr-i	OMe	Cl	CH ₂ OSO ₂ Me	Ms	H
30	Pr-i	OMe	Cl	CHMeOSO ₂ Me	Ms	H

35

40

45

50

55

	A	E	X	Y	Z	G
5	Me	SMe	Me	CH ₂ OMe	Ms	H
	Me	SMe	Me	CH ₂ OE t	Ms	H
	Me	SMe	Me	CHMeOMe	Ms	H
	Me	SMe	Me	CHMeOE t	Ms	H
10	Me	SMe	Me	CHEtOMe	Ms	H
	Me	SMe	Me	CHEtOE t	Ms	H
	Me	SMe	Cl	CH ₂ OMe	Ms	H
	Me	SMe	Cl	CH ₂ OE t	Ms	H
15	Me	SMe	Cl	CHMeOMe	Ms	H
	Me	SMe	Cl	CHMeOE t	Ms	H
	Et	SMe	Me	CH ₂ OMe	Ms	H
	Et	SMe	Me	CH ₂ OE t	Ms	H
	Et	SMe	Me	CHMeOMe	Ms	H
20	Et	SMe	Me	CHMeOE t	Ms	H
	Et	SMe	Me	CHEtOMe	Ms	H
	Et	SMe	Me	CHEtOE t	Ms	H
	Et	SMe	Cl	CH ₂ OMe	Ms	H
25	Et	SMe	Cl	CH ₂ OE t	Ms	H
	Et	SMe	Cl	CHMeOMe	Ms	H
	Et	SMe	Cl	CHMeOE t	Ms	H
	Pr-i	SMe	Me	CH ₂ OMe	Ms	H
	Pr-i	SMe	Me	CH ₂ OE t	Ms	H
30	Pr-i	SMe	Me	CHMeOMe	Ms	H
	Pr-i	SMe	Me	CHMeOE t	Ms	H
	Pr-i	SMe	Me	CHEtOMe	Ms	H
	Pr-i	SMe	Me	CHEtOE t	Ms	H
	Pr-i	SMe	Cl	CH ₂ OMe	Ms	H
35	Pr-i	SMe	Cl	CH ₂ OE t	Ms	H
	Pr-i	SMe	Cl	CHMeOMe	Ms	H
	Pr-i	SMe	Cl	CHMeOE t	Ms	H
	Me	CH ₂ SMe	Me	CH ₂ OMe	Ms	H
40	Me	CH ₂ SMe	Me	CH ₂ OE t	Ms	H
	Me	CH ₂ SMe	Me	CHMeOMe	Ms	H
	Me	CH ₂ SMe	Me	CHMeOE t	Ms	H
	Me	CH ₂ SMe	Me	CHEtOMe	Ms	H
	Me	CH ₂ SMe	Me	CHEtOE t	Ms	H
45	Me	CH ₂ SMe	Cl	CH ₂ OMe	Ms	H
	Me	CH ₂ SMe	Cl	CH ₂ OE t	Ms	H
	Me	CH ₂ SMe	Cl	CHMeOMe	Ms	H
	Me	CH ₂ SMe	Cl	CHMeOE t	Ms	H

50

55

	A	B	X	Y	Z	Q
5	Et	CH ₂ SMe	Me	CH ₂ OMe	Ms	H
	Et	CH ₂ SMe	Me	CH ₂ OE _t	Ms	H
	Et	CH ₂ SMe	Me	CHMeOMe	Ms	H
10	Et	CH ₂ SMe	Me	CHMeOE _t	Ms	H
	Et	CH ₂ SMe	Me	CHEtOMe	Ms	H
	Et	CH ₂ SMe	Me	CHEtOE _t	Ms	H
	Et	CH ₂ SMe	Cl	CH ₂ OMe	Ms	H
	Et	CH ₂ SMe	Cl	CH ₂ OE _t	Ms	H
15	Et	CH ₂ SMe	Cl	CHMeOMe	Ms	H
	Et	CH ₂ SMe	Cl	CHMeOE _t	Ms	H
	Pr-i	CH ₂ SMe	Me	CH ₂ OMe	Ms	H
	Pr-i	CH ₂ SMe	Me	CH ₂ OE _t	Ms	H
	Pr-i	CH ₂ SMe	Me	CHMeOMe	Ms	H
20	Pr-i	CH ₂ SMe	Me	CHMeOE _t	Ms	H
	Pr-i	CH ₂ SMe	Me	CHEtOMe	Ms	H
	Pr-i	CH ₂ SMe	Me	CHEtOE _t	Ms	H
	Pr-i	CH ₂ SMe	Cl	CH ₂ OMe	Ms	H
25	Pr-i	CH ₂ SMe	Cl	CH ₂ OE _t	Ms	H
	Pr-i	CH ₂ SMe	Cl	CHMeOMe	Ms	H
	Pr-i	CH ₂ SMe	Cl	CHMeOE _t	Ms	H
	Me	CH ₂ Cl	Me	CH ₂ OMe	Ms	H
	Me	CH ₂ Cl	Me	CH ₂ OE _t	Ms	H
30	Me	CH ₂ Cl	Me	CHMeOMe	Ms	H
	Me	CH ₂ Cl	Me	CHMeOE _t	Ms	H
	Me	CH ₂ Cl	Me	CHEtOMe	Ms	H
	Me	CH ₂ Cl	Me	CHEtOE _t	Ms	H
	Me	CH ₂ Cl	Cl	CH ₂ OMe	Ms	H
35	Me	CH ₂ Cl	Cl	CH ₂ OE _t	Ms	H
	Me	CH ₂ Cl	Cl	CHMeOMe	Ms	H
	Me	CH ₂ Cl	Cl	CHMeOE _t	Ms	H
	Et	CH ₂ Cl	Me	CH ₂ OMe	Ms	H
40	Et	CH ₂ Cl	Me	CH ₂ OE _t	Ms	H
	Et	CH ₂ Cl	Me	CHMeOMe	Ms	H
	Et	CH ₂ Cl	Me	CHMeOE _t	Ms	H
	Et	CH ₂ Cl	Me	CHEtOMe	Ms	H
	Et	CH ₂ Cl	Me	CHEtOE _t	Ms	H
45	Et	CH ₂ Cl	Cl	CH ₂ OMe	Ms	H
	Et	CH ₂ Cl	Cl	CH ₂ OE _t	Ms	H
	Et	CH ₂ Cl	Cl	CHMeOMe	Ms	H
	Et	CH ₂ Cl	Cl	CHMeOE _t	Ms	H

50

55

	A	E	X	Y	Z	Q
5	Pr-i	CH ₂ Cl	Me	CH ₂ OMe	Ms	H
	Pr-i	CH ₂ Cl	Me	CH ₂ OE _t	Ms	H
	Pr-i	CH ₂ Cl	Me	CHMeOMe	Ms	H
	Pr-i	CH ₂ Cl	Me	CHMeOE _t	Ms	H
10	Pr-i	CH ₂ Cl	Me	CHEtOMe	Ms	H
	Pr-i	CH ₂ Cl	Me	CHEtOE _t	Ms	H
	Pr-i	CH ₂ Cl	Cl	CH ₂ OMe	Ms	H
	Pr-i	CH ₂ Cl	Cl	CH ₂ OE _t	Ms	H
	Pr-i	CH ₂ Cl	Cl	CHMeOMe	Ms	H
15	Pr-i	CH ₂ Cl	Cl	CHMeOE _t	Ms	H

20

25

30

35

40

45

50

55

	A	B	X	Y	Z	Q
5	Me	H	CH ₂ OMe	CH ₂ OH	Ms	H
	Me	H	CH ₂ OMe	CH ₂ OMe	Ms	H
	Me	H	CH ₂ OMe	CH ₂ OMe	Cl	H
	Me	H	CH ₂ OMe	CH ₂ OMe	MeS	H
10	Me	H	CH ₂ OMe	CH ₂ OMe	MeSO	H
	Me	H	CH ₂ OMe	CH ₂ OEt	Ms	H
	Me	H	CH ₂ OMe	CH ₂ OEt	Cl	H
	Me	H	CH ₂ OMe	CH ₂ OEt	MeS	H
	Me	H	CH ₂ OMe	CH ₂ OEt	MeSO	H
15	Me	H	CH ₂ OMe	CH ₂ OPr-i	Ms	H
	Me	H	CH ₂ OMe	CH ₂ OPr-n	Ms	H
	Me	H	CH ₂ OMe	CH ₂ OCH=CH ₂	Ms	H
	Me	H	CH ₂ OMe	CH ₂ OCH ₂ CH=CH ₂	Ms	H
20	Me	H	CH ₂ OMe	CH ₂ OCH ₂ C≡CH	Ms	H
	Me	H	CH ₂ OMe	CH ₂ OCH ₂ CH ₂ Cl	Ms	H
	Me	H	CH ₂ OMe	CHMeOH	Ms	H
	Me	H	CH ₂ OMe	CHMeOMe	Ms	H
	Me	H	CH ₂ OMe	CHMeOMe	Cl	H
25	Me	H	CH ₂ OMe	CHMeOMe	MeS	H
	Me	H	CH ₂ OMe	CHMeOMe	MeSO	H
	Me	H	CH ₂ OMe	CHMeOEt	Ms	H
	Me	H	CH ₂ OMe	CHMeOCH=CH ₂	Ms	H
30	Me	H	CH ₂ OMe	CHMeOCH=CH ₂	Ms	H
	Me	H	CH ₂ OMe	CHMeOCH ₂ CH=CH ₂	Ms	H
	Me	H	CH ₂ OMe	CHMeOCH ₂ C≡CH	Ms	H
	Me	H	CH ₂ OMe	CHMeOCH ₂ CH ₂ Cl	Ms	H
	Me	H	CH ₂ OMe	CMe ₂ OH	Ms	H
35	Me	H	CH ₂ OMe	CMe ₂ OMe	Ms	H
	Me	H	CH ₂ OMe	CMe ₂ OEt	Ms	H
	Me	H	CH ₂ OMe	CH ₂ CH ₂ OMe	Ms	H
	Me	H	CH ₂ OMe	CH ₂ CH ₂ OEt	Ms	H
40	Me	H	CH ₂ OMe	CHEtOH	Ms	H
	Me	H	CH ₂ OMe	CHEtOMe	Ms	H
	Me	H	CH ₂ OMe	CHEtOEt	Ms	H
	Me	H	CH ₂ OMe	CH ₂ OCH ₂ CH ₂ OMe	Ms	H
	Me	H	CH ₂ OMe	CHMeOCH ₂ CH ₂ OMe	Ms	H
45	Me	H	CH ₂ OMe	CH ₂ NMe ₂	Ms	H
	Me	H	CH ₂ OMe	CHMeNMe ₂	Ms	H
	Me	H	CH ₂ OMe	CH ₂ CH ₂ NMe ₂	Ms	H
	Me	H	CH ₂ OMe	CH ₂ OCH ₂ Ph	Ms	H

50

55

	A	B	X	Y	Z	Q
5	Me	H	CH ₂ OMe	CHMeOCH ₂ Ph	Ms	H
	Me	H	CH ₂ OMe	CH ₂ OCH ₂ CO ₂ Me	Ms	H
	Me	H	CH ₂ OMe	CH ₂ OCH ₂ CO ₂ Et	Ms	H
10	Me	H	CH ₂ OMe	CH ₂ OCHMeCO ₂ Me	Ms	H
	Me	H	CH ₂ OMe	CH ₂ CN	Ms	H
	Me	H	CH ₂ OMe	CH ₂ SMe	Ms	H
	Me	H	CH ₂ OMe	CH ₂ SEt	Ms	H
	Me	H	CH ₂ OMe	CH ₂ SOMe	Ms	H
15	Me	H	CH ₂ OMe	CH ₂ SO ₂ Me	Ms	H
	Me	H	CH ₂ OMe	CH ₂ SO ₂ Et	Ms	H
	Me	H	CH ₂ OMe	CHMeSMe	Ms	H
	Me	H	CH ₂ OMe	CHMeSO ₂ Me	Ms	H
20	Me	H	CH ₂ OMe	CH ₂ SCH ₂ CH ₂ OMe	Ms	H
	Me	H	CH ₂ OMe	CH ₂ OCOMe	Ms	H
	Me	H	CH ₂ OMe	CHMeOCOMe	Ms	H
	Me	H	CH ₂ OMe	CH ₂ OSO ₂ Me	Ms	H
	Me	H	CH ₂ OMe	CHMeOSO ₂ Me	Ms	H
25	Et	H	CH ₂ OMe	CH ₂ OH	Ms	H
	Et	H	CH ₂ OMe	CH ₂ OMe	Ms	H
	Et	H	CH ₂ OMe	CH ₂ OMe	Cl	H
	Et	H	CH ₂ OMe	CH ₂ OMe	MeS	H
	Et	H	CH ₂ OMe	CH ₂ OMe	MeSO	H
30	Et	H	CH ₂ OMe	CH ₂ OEt	Ms	H
	Et	H	CH ₂ OMe	CH ₂ OEt	Cl	H
	Et	H	CH ₂ OMe	CH ₂ OEt	MeS	H
	Et	H	CH ₂ OMe	CH ₂ OEt	MeSO	H
35	Et	H	CH ₂ OMe	CH ₂ OPr-i	Ms	H
	Et	H	CH ₂ OMe	CH ₂ OPr-n	Ms	H
	Et	H	CH ₂ OMe	CH ₂ OCH=CH ₂	Ms	H
	Et	H	CH ₂ OMe	CH ₂ OCH ₂ CH=CH ₂	Ms	H
	Et	H	CH ₂ OMe	CH ₂ OCH ₂ C≡CH	Ms	H
40	Et	H	CH ₂ OMe	CH ₂ OCH ₂ CH ₂ Cl	Ms	H
	Et	H	CH ₂ OMe	CHMeOH	Ms	H
	Et	H	CH ₂ OMe	CHMeOMe	Ms	H
	Et	H	CH ₂ OMe	CHMeOMe	Cl	H
	Et	H	CH ₂ OMe	CHMeOMe	MeS	H
45	Et	H	CH ₂ OMe	CHMeOMe	MeSO	H
	Et	H	CH ₂ OMe	CHMeOEt	Ms	H
	Et	H	CH ₂ OMe	CHMeOCH=CH ₂	Ms	H
	Et	H	CH ₂ OMe	CHMeOCH=CH ₂	Ms	H

50

55

	A	B	X	Y	Z	Q
5	Et	H	CH ₂ OMe	CHMeOCH ₂ CH=CH ₂	Ms	H
	Et	H	CH ₂ OMe	CHMeOCH ₂ C≡CH	Ms	H
	Et	H	CH ₂ OMe	CHMeOCH ₂ CH ₂ Cl	Ms	H
	Et	H	CH ₂ OMe	CMe ₂ OH	Ms	H
10	Et	H	CH ₂ OMe	CMe ₂ OMe	Ms	H
	Et	H	CH ₂ OMe	CMe ₂ OE t	Ms	H
	Et	H	CH ₂ OMe	CH ₂ CH ₂ OMe	Ms	H
	Et	H	CH ₂ OMe	CH ₂ CH ₂ OE t	Ms	H
15	Et	H	CH ₂ OMe	CHEtOH	Ms	H
	Et	H	CH ₂ OMe	CHEtOMe	Ms	H
	Et	H	CH ₂ OMe	CHEtOE t	Ms	H
	Et	H	CH ₂ OMe	CH ₂ OCH ₂ CH ₂ OMe	Ms	H
	Et	H	CH ₂ OMe	CHMeOCH ₂ CH ₂ OMe	Ms	H
20	Et	H	CH ₂ OMe	CH ₂ NMe ₂	Ms	H
	Et	H	CH ₂ OMe	CHMeNMe ₂	Ms	H
	Et	H	CH ₂ OMe	CH ₂ CH ₂ NMe ₂	Ms	H
	Et	H	CH ₂ OMe	CH ₂ OCH ₂ Ph	Ms	H
25	Et	H	CH ₂ OMe	CHMeOCH ₂ Ph	Ms	H
	Et	H	CH ₂ OMe	CH ₂ OCH ₂ CO ₂ Me	Ms	H
	Et	H	CH ₂ OMe	CH ₂ OCH ₂ CO ₂ Et	Ms	H
	Et	H	CH ₂ OMe	CH ₂ OCHMeCO ₂ Me	Ms	H
	Et	H	CH ₂ OMe	CH ₂ CN	Ms	H
30	Et	H	CH ₂ OMe	CH ₂ SMe	Ms	H
	Et	H	CH ₂ OMe	CH ₂ SE t	Ms	H
	Et	H	CH ₂ OMe	CH ₂ SOMe	Ms	H
	Et	H	CH ₂ OMe	CH ₂ SO ₂ Me	Ms	H
	Et	H	CH ₂ OMe	CH ₂ SO ₂ Et	Ms	H
35	Et	H	CH ₂ OMe	CHMeSMe	Ms	H
	Et	H	CH ₂ OMe	CHMeSO ₂ Me	Ms	H
	Et	H	CH ₂ OMe	CH ₂ SCH ₂ CH ₂ OMe	Ms	H
	Et	H	CH ₂ OMe	CH ₂ OCOMe	Ms	H
40	Et	H	CH ₂ OMe	CHMeOCOMe	Ms	H
	Et	H	CH ₂ OMe	CH ₂ OSO ₂ Me	Ms	H
	Et	H	CH ₂ OMe	CHMeOSO ₂ Me	Ms	H
	Pr-i	H	CH ₂ OMe	CH ₂ OH	Ms	H
	Pr-i	H	CH ₂ OMe	CH ₂ OMe	Ms	H
45	Pr-i	H	CH ₂ OMe	CH ₂ OMe	Cl	H
	Pr-i	H	CH ₂ OMe	CH ₂ OMe	MeS	H
	Pr-i	H	CH ₂ OMe	CH ₂ OMe	MeSO	H
	Pr-i	H	CH ₂ OMe	CH ₂ OE t	Ms	H
50						
55						

	A	B	X	Y	Z	Q
5	Pr-i	H	CH ₂ OMe	CH ₂ OE _t	Cl	H
	Pr-i	H	CH ₂ OMe	CH ₂ OE _t	MeS	H
	Pr-i	H	CH ₂ OMe	CH ₂ OE _t	MeSO	H
	Pr-i	H	CH ₂ OMe	CH ₂ OPr-i	Ms	H
10	Pr-i	H	CH ₂ OMe	CH ₂ OPr-n	Ms	H
	Pr-i	H	CH ₂ OMe	CH ₂ OCH=CH ₂	Ms	H
	Pr-i	H	CH ₂ OMe	CH ₂ OCH ₂ CH=CH ₂	Ms	H
	Pr-i	H	CH ₂ OMe	CH ₂ OCH ₂ C≡CH	Ms	H
15	Pr-i	H	CH ₂ OMe	CH ₂ OCH ₂ CH ₂ Cl	Ms	H
	Pr-i	H	CH ₂ OMe	CHMeOH	Ms	H
	Pr-i	H	CH ₂ OMe	CHMeOMe	Ms	H
	Pr-i	H	CH ₂ OMe	CHMeOMe	Cl	H
	Pr-i	H	CH ₂ OMe	CHMeOMe	MeS	H
20	Pr-i	H	CH ₂ OMe	CHMeOMe	MeSO	H
	Pr-i	H	CH ₂ OMe	CHMeOE _t	Ms	H
	Pr-i	H	CH ₂ OMe	CHMeOCH=CH ₂	Ms	H
	Pr-i	H	CH ₂ OMe	CHMeOCH=CH ₂	Ms	H
	Pr-i	H	CH ₂ OMe	CHMeOCH ₂ CH=CH ₂	Ms	H
25	Pr-i	H	CH ₂ OMe	CHMeOCH ₂ C≡CH	Ms	H
	Pr-i	H	CH ₂ OMe	CHMeOCH ₂ CH ₂ Cl	Ms	H
	Pr-i	H	CH ₂ OMe	CMe ₂ OH	Ms	H
	Pr-i	H	CH ₂ OMe	CMe ₂ OMe	Ms	H
30	Pr-i	H	CH ₂ OMe	CMe ₂ OE _t	Ms	H
	Pr-i	H	CH ₂ OMe	CH ₂ CH ₂ OMe	Ms	H
	Pr-i	H	CH ₂ OMe	CH ₂ CH ₂ OE _t	Ms	H
	Pr-i	H	CH ₂ OMe	CHEtOH	Ms	H
	Pr-i	H	CH ₂ OMe	CHEtOMe	Ms	H
35	Pr-i	H	CH ₂ OMe	CHEtOE _t	Ms	H
	Pr-i	H	CH ₂ OMe	CH ₂ OCH ₂ CH ₂ OMe	Ms	H
	Pr-i	H	CH ₂ OMe	CHMeOCH ₂ CH ₂ OMe	Ms	H
	Pr-i	H	CH ₂ OMe	CH ₂ NMe ₂	Ms	H
40	Pr-i	H	CH ₂ OMe	CHMeNMe ₂	Ms	H
	Pr-i	H	CH ₂ OMe	CH ₂ CH ₂ NMe ₂	Ms	H
	Pr-i	H	CH ₂ OMe	CH ₂ OCH ₂ Ph	Ms	H
	Pr-i	H	CH ₂ OMe	CHMeOCH ₂ Ph	Ms	H
	Pr-i	H	CH ₂ OMe	CH ₂ OCH ₂ CO ₂ Me	Ms	H
45	Pr-i	H	CH ₂ OMe	CH ₂ OCH ₂ CO ₂ Et	Ms	H
	Pr-i	H	CH ₂ OMe	CH ₂ OCHMeCO ₂ Me	Ms	H
	Pr-i	H	CH ₂ OMe	CH ₂ CN	Ms	H
	Pr-i	H	CH ₂ OMe	CH ₂ SMe	Ms	H

50

55

	A	B	X	Y	Z	Q
5	Pr-i	H	CH ₂ OMe	CH ₂ SEt	Ms	H
	Pr-i	H	CH ₂ OMe	CH ₂ SOMe	Ms	H
	Pr-i	H	CH ₂ OMe	CH ₂ SO ₂ Me	Ms	H
	Pr-i	H	CH ₂ OMe	CH ₂ SO ₂ Et	Ms	H
10	Pr-i	H	CH ₂ OMe	CHMeSMe	Ms	H
	Pr-i	H	CH ₂ OMe	CHMeSO ₂ Me	Ms	H
	Pr-i	H	CH ₂ OMe	CH ₂ SCH ₂ CH ₂ OMe	Ms	H
	Pr-i	H	CH ₂ OMe	CH ₂ OCOMe	Ms	H
	Pr-i	H	CH ₂ OMe	CHMeOCOMe	Ms	H
15	Pr-i	H	CH ₂ OMe	CH ₂ OSO ₂ Me	Ms	H
	Pr-i	H	CH ₂ OMe	CHMeOSO ₂ Me	Ms	H

20

25

30

35

40

45

50

55

	A	B	X	Y	Z	Q
5	Me	Me	CH ₂ OMe	CH ₂ OH	Ms	H
	Me	Me	CH ₂ OMe	CH ₂ OMe	Ms	H
	Me	Me	CH ₂ OMe	CH ₂ OMe	Cl	H
10	Me	Me	CH ₂ OMe	CH ₂ OMe	MeS	H
	Me	Me	CH ₂ OMe	CH ₂ OMe	MeSO	H
	Me	Me	CH ₂ OMe	CH ₂ OE t	Ms	H
	Me	Me	CH ₂ OMe	CH ₂ OE t	Cl	H
	Me	Me	CH ₂ OMe	CH ₂ OE t	MeS	H
15	Me	Me	CH ₂ OMe	CH ₂ OE t	MeSO	H
	Me	Me	CH ₂ OMe	CH ₂ OP r - i	Ms	H
	Me	Me	CH ₂ OMe	CH ₂ OP r - n	Ms	H
	Me	Me	CH ₂ OMe	CH ₂ OCH = CH ₂	Ms	H
20	Me	Me	CH ₂ OMe	CH ₂ OCH ₂ CH = CH ₂	Ms	H
	Me	Me	CH ₂ OMe	CH ₂ OCH ₂ C ≡ CH	Ms	H
	Me	Me	CH ₂ OMe	CH ₂ OCH ₂ CH ₂ Cl	Ms	H
	Me	Me	CH ₂ OMe	CHMeOH	Ms	H
	Me	Me	CH ₂ OMe	CHMeOMe	Ms	H
25	Me	Me	CH ₂ OMe	CHMeOMe	Cl	H
	Me	Me	CH ₂ OMe	CHMeOMe	MeS	H
	Me	Me	CH ₂ OMe	CHMeOMe	MeSO	H
	Me	Me	CH ₂ OMe	CHMeOE t	Ms	H
30	Me	Me	CH ₂ OMe	CH ₂ CH ₂ OMe	Ms	H
	Me	Me	CH ₂ OMe	CH ₂ CH ₂ OE t	Ms	H
	Me	Me	CH ₂ OMe	CH ₂ OH	Ms	H
	Me	Me	CH ₂ OMe	CH ₂ OMe	Ms	H
	Me	Me	CH ₂ OMe	CH ₂ OE t	Ms	H
35	Me	Me	CH ₂ OMe	CH ₂ OCH ₂ CH ₂ OMe	Ms	H
	Me	Me	CH ₂ OMe	CH ₂ NMe ₂	Ms	H
	Me	Me	CH ₂ OMe	CH ₂ OCH ₂ Ph	Ms	H
	Me	Me	CH ₂ OMe	CH ₂ OCH ₂ CO ₂ Me	Ms	H
	Me	Me	CH ₂ OMe	CH ₂ OCH ₂ CO ₂ E t	Ms	H
40	Me	Me	CH ₂ OMe	CH ₂ OCHMeCO ₂ Me	Ms	H
	Me	Me	CH ₂ OMe	CH ₂ CN	Ms	H
	Me	Me	CH ₂ OMe	CH ₂ SMe	Ms	H
	Me	Me	CH ₂ OMe	CH ₂ SE t	Ms	H
	Me	Me	CH ₂ OMe	CH ₂ SO ₂ Me	Ms	H
45	Me	Me	CH ₂ OMe	CH ₂ SO ₂ E t	Ms	H
	Me	Me	CH ₂ OMe	CH ₂ SCH ₂ CH ₂ OMe	Ms	H
	Me	Me	CH ₂ OMe	CH ₂ OCOMe	Ms	H
	Me	Me	CH ₂ OMe	CHMeOCOMe	Ms	H
50						
55						

	A	B	X	Y	Z	Q
5	Me	Me	CH ₂ OMe	CH ₂ OSO ₂ Me	Ms	H
	Me	Me	CH ₂ OMe	CHMeOSO ₂ Me	Ms	H
	Et	Me	CH ₂ OMe	CH ₂ OH	Ms	H
10	Et	Me	CH ₂ OMe	CH ₂ OMe	Ms	H
	Et	Me	CH ₂ OMe	CH ₂ OMe	Cl	H
	Et	Me	CH ₂ OMe	CH ₂ OMe	MeS	H
	Et	Me	CH ₂ OMe	CH ₂ OMe	MeSO	H
	Et	Me	CH ₂ OMe	CH ₂ OEt	Ms	H
15	Et	Me	CH ₂ OMe	CH ₂ OEt	Cl	H
	Et	Me	CH ₂ OMe	CH ₂ OEt	MeS	H
	Et	Me	CH ₂ OMe	CH ₂ OEt	MeSO	H
	Et	Me	CH ₂ OMe	CH ₂ OPr-i	Ms	H
20	Et	Me	CH ₂ OMe	CH ₂ OPr-n	Ms	H
	Et	Me	CH ₂ OMe	CH ₂ OCH=CH ₂	Ms	H
	Et	Me	CH ₂ OMe	CH ₂ OCH ₂ CH=CH ₂	Ms	H
	Et	Me	CH ₂ OMe	CH ₂ OCH ₂ C≡CH	Ms	H
	Et	Me	CH ₂ OMe	CH ₂ OCH ₂ CH ₂ Cl	Ms	H
25	Et	Me	CH ₂ OMe	CHMeOH	Ms	H
	Et	Me	CH ₂ OMe	CHMeOMe	Ms	H
	Et	Me	CH ₂ OMe	CHMeOMe	Cl	H
	Et	Me	CH ₂ OMe	CHMeOMe	MeS	H
	Et	Me	CH ₂ OMe	CHMeOMe	MeSO	H
30	Et	Me	CH ₂ OMe	CHMeOEt	Ms	H
	Et	Me	CH ₂ OMe	CH ₂ CH ₂ OMe	Ms	H
	Et	Me	CH ₂ OMe	CH ₂ CH ₂ OEt	Ms	H
	Et	Me	CH ₂ OMe	CH ₂ OH	Ms	H
	Et	Me	CH ₂ OMe	CH ₂ OMe	Ms	H
35	Et	Me	CH ₂ OMe	CH ₂ OEt	Ms	H
	Et	Me	CH ₂ OMe	CH ₂ OCH ₂ CH ₂ OMe	Ms	H
	Et	Me	CH ₂ OMe	CH ₂ NMe ₂	Ms	H
	Et	Me	CH ₂ OMe	CH ₂ OCH ₂ Ph	Ms	H
40	Et	Me	CH ₂ OMe	CH ₂ OCH ₂ CO ₂ Me	Ms	H
	Et	Me	CH ₂ OMe	CH ₂ OCH ₂ CO ₂ Et	Ms	H
	Et	Me	CH ₂ OMe	CH ₂ OCHMeCO ₂ Me	Ms	H
	Et	Me	CH ₂ OMe	CH ₂ CN	Ms	H
	Et	Me	CH ₂ OMe	CH ₂ SMe	Ms	H
45	Et	Me	CH ₂ OMe	CH ₂ SEt	Ms	H
	Et	Me	CH ₂ OMe	CH ₂ SO ₂ Me	Ms	H
	Et	Me	CH ₂ OMe	CH ₂ SO ₂ Et	Ms	H
	Et	Me	CH ₂ OMe	CH ₂ SCH ₂ CH ₂ OMe	Ms	H
50						
55						

	A	E	X	Y	Z	Q
5	Et	Me	CH ₂ OMe	CH ₂ OCOMe	Ms	H
	Et	Me	CH ₂ OMe	CHMeOCOMe	Ms	H
	Et	Me	CH ₂ OMe	CH ₂ OSO ₂ Me	Ms	H
	Et	Me	CH ₂ OMe	CHMeOSO ₂ Me	Ms	H
10	Pr-i	Me	CH ₂ OMe	CH ₂ OH	Ms	H
	Pr-i	Me	CH ₂ OMe	CH ₂ OMe	Ms	H
	Pr-i	Me	CH ₂ OMe	CH ₂ OMe	Cl	H
	Pr-i	Me	CH ₂ OMe	CH ₂ OMe	MeS	H
	Pr-i	Me	CH ₂ OMe	CH ₂ OMe	MeSO	H
15	Pr-i	Me	CH ₂ OMe	CH ₂ OE t	Ms	H
	Pr-i	Me	CH ₂ OMe	CH ₂ OE t	Cl	H
	Pr-i	Me	CH ₂ OMe	CH ₂ OE t	MeS	H
	Pr-i	Me	CH ₂ OMe	CH ₂ OE t	MeSO	H
20	Pr-i	Me	CH ₂ OMe	CH ₂ OPr-i	Ms	H
	Pr-i	Me	CH ₂ OMe	CH ₂ OPr-n	Ms	H
	Pr-i	Me	CH ₂ OMe	CH ₂ OCH=CH ₂	Ms	H
	Pr-i	Me	CH ₂ OMe	CH ₂ OCH ₂ CH=CH ₂	Ms	H
	Pr-i	Me	CH ₂ OMe	CH ₂ OCH ₂ C≡CH	Ms	H
25	Pr-i	Me	CH ₂ OMe	CH ₂ OCH ₂ CH ₂ Cl	Ms	H
	Pr-i	Me	CH ₂ OMe	CHMeOH	Ms	H
	Pr-i	Me	CH ₂ OMe	CHMeOMe	Ms	H
	Pr-i	Me	CH ₂ OMe	CHMeOMe	Cl	H
30	Pr-i	Me	CH ₂ OMe	CHMeOMe	MeS	H
	Pr-i	Me	CH ₂ OMe	CHMeOMe	MeSO	H
	Pr-i	Me	CH ₂ OMe	CHMeOE t	Ms	H
	Pr-i	Me	CH ₂ OMe	CH ₂ CH ₂ OMe	Ms	H
	Pr-i	Me	CH ₂ OMe	CH ₂ CH ₂ OE t	Ms	H
35	Pr-i	Me	CH ₂ OMe	CHEtOH	Ms	H
	Pr-i	Me	CH ₂ OMe	CHEtOMe	Ms	H
	Pr-i	Me	CH ₂ OMe	CHEtOE t	Ms	H
	Pr-i	Me	CH ₂ OMe	CH ₂ OCH ₂ CH ₂ OMe	Ms	H
40	Pr-i	Me	CH ₂ OMe	CH ₂ NMe ₂	Ms	H
	Pr-i	Me	CH ₂ OMe	CH ₂ OCH ₂ Ph	Ms	H
	Pr-i	Me	CH ₂ OMe	CH ₂ OCH ₂ CO ₂ Me	Ms	H
	Pr-i	Me	CH ₂ OMe	CH ₂ OCH ₂ CO ₂ Et	Ms	H
	Pr-i	Me	CH ₂ OMe	CH ₂ OCHMeCO ₂ Me	Ms	H
45	Pr-i	Me	CH ₂ OMe	CH ₂ CN	Ms	H
	Pr-i	Me	CH ₂ OMe	CH ₂ SMe	Ms	H
	Pr-i	Me	CH ₂ OMe	CH ₂ SE t	Ms	H
	Pr-i	Me	CH ₂ OMe	CH ₂ SO ₂ Me	Ms	H

50

55

	A	B	X	Y	Z	G
5	Pr-i	Me	CH ₂ OMe	CH ₂ SO ₂ Et	Ms	H
	Pr-i	Me	CH ₂ OMe	CH ₂ SCH ₂ CH ₂ OMe	Ms	H
	Pr-i	Me	CH ₂ OMe	CH ₂ OCOMe	Ms	H
	Pr-i	Me	CH ₂ OMe	CHMeOCOMe	Ms	H
	Pr-i	Me	CH ₂ OMe	CH ₂ OSO ₂ Me	Ms	H
10	Pr-i	Me	CH ₂ OMe	CHMeOSO ₂ Me	Ms	H

15

20

25

30

35

40

45

50

55

	A	B	X	Y	Z	Q
5	Me	H	Pr-i	CH ₂ OMe	Ms	H
	Me	H	Pr-i	CH ₂ OEt	Ms	H
	Me	H	Pr-i	CHMeOMe	Ms	H
	Me	H	Pr-i	CHMeOEt	Ms	H
10	Me	H	Pr-i	CHEtOMe	Ms	H
	Me	H	Pr-i	CHEtOEt	Ms	H
	Me	H	Pr-i	CH ₂ SMe	Ms	H
	Me	H	Pr-i	CH ₂ SEt	Ms	H
15	Me	H	Pr-i	CH ₂ SO ₂ Me	Ms	H
	Me	H	Pr-i	CH ₂ OCOMe	Ms	H
	Me	H	Pr-i	CHMeOCOMe	Ms	H
	Me	H	Pr-i	CH ₂ OSO ₂ Me	Ms	H
	Me	H	Pr-i	CHMeOSO ₂ Me	Ms	H
20	Et	H	Pr-i	CH ₂ OMe	Ms	H
	Et	H	Pr-i	CH ₂ OEt	Ms	H
	Et	H	Pr-i	CHMeOMe	Ms	H
	Et	H	Pr-i	CHMeOEt	Ms	H
25	Et	H	Pr-i	CHEtOMe	Ms	H
	Et	H	Pr-i	CHEtOEt	Ms	H
	Et	H	Pr-i	CH ₂ SMe	Ms	H
	Et	H	Pr-i	CH ₂ SEt	Ms	H
	Et	H	Pr-i	CH ₂ SO ₂ Me	Ms	H
30	Et	H	Pr-i	CH ₂ OCOMe	Ms	H
	Et	H	Pr-i	CHMeOCOMe	Ms	H
	Et	H	Pr-i	CH ₂ OSO ₂ Me	Ms	H
	Et	H	Pr-i	CHMeOSO ₂ Me	Ms	H
	Pr-i	H	Pr-i	CH ₂ OMe	Ms	H
35	Pr-i	H	Pr-i	CH ₂ OEt	Ms	H
	Pr-i	H	Pr-i	CHMeOMe	Ms	H
	Pr-i	H	Pr-i	CHMeOEt	Ms	H
	Pr-i	H	Pr-i	CHEtOMe	Ms	H
	Pr-i	H	Pr-i	CHEtOEt	Ms	H
40	Pr-i	H	Pr-i	CH ₂ SMe	Ms	H
	Pr-i	H	Pr-i	CH ₂ SEt	Ms	H
	Pr-i	H	Pr-i	CH ₂ SO ₂ Me	Ms	H
	Pr-i	H	Pr-i	CH ₂ OCOMe	Ms	H
45	Pr-i	H	Pr-i	CHMeOCOMe	Ms	H
	Pr-i	H	Pr-i	CH ₂ OSO ₂ Me	Ms	H
	Pr-i	H	Pr-i	CHMeOSO ₂ Me	Ms	H
	Me	Me	Pr-i	CH ₂ OMe	Ms	H

50

55

	A	B	X	Y	Z	Q
5	Me	Me	Pr-i	CH ₂ OEt	Ms	H
	Me	Me	Pr-i	CHMeOMe	Ms	H
	Me	Me	Pr-i	CHMeOEt	Ms	H
10	Me	Me	Pr-i	CH ₂ SMe	Ms	H
	Me	Me	Pr-i	CH ₂ SO ₂ Me	Ms	H
	Et	Me	Pr-i	CH ₂ OMe	Ms	H
	Et	Me	Pr-i	CH ₂ OEt	Ms	H
	Et	Me	Pr-i	CHMeOMe	Ms	H
15	Et	Me	Pr-i	CHMeOEt	Ms	H
	Et	Me	Pr-i	CH ₂ SMe	Ms	H
	Et	Me	Pr-i	CH ₂ SO ₂ Me	Ms	H
	Pr-i	Me	Pr-i	CH ₂ OMe	Ms	H
	Pr-i	Me	Pr-i	CH ₂ OEt	Ms	H
20	Pr-i	Me	Pr-i	CHMeOMe	Ms	H
	Pr-i	Me	Pr-i	CHMeOEt	Ms	H
	Pr-i	Me	Pr-i	CH ₂ SMe	Ms	H
	Pr-i	Me	Pr-i	CH ₂ SO ₂ Me	Ms	H
25	Me	H	F	CH ₂ OMe	Ms	H
	Me	H	F	CH ₂ OEt	Ms	H
	Me	H	F	CHMeOMe	Ms	H
	Et	H	F	CH ₂ OMe	Ms	H
	Et	H	F	CH ₂ OEt	Ms	H
30	Et	H	F	CHMeOMe	Ms	H
	Et	H	F	CHMeOEt	Ms	H
	Pr-i	H	F	CH ₂ OMe	Ms	H
	Pr-i	H	F	CH ₂ OEt	Ms	H
	Pr-i	H	F	CHMeOMe	Ms	H
35	Me	Me	F	CH ₂ OMe	Ms	H
	Me	Me	F	CH ₂ OEt	Ms	H
	Et	Me	F	CH ₂ OMe	Ms	H
	Et	Me	F	CH ₂ OEt	Ms	H
40	Et	Me	F	CHMeOMe	Ms	H
	Pr-i	Me	F	CH ₂ OMe	Ms	H
	Pr-i	Me	F	CH ₂ OEt	Ms	H
	Me	H	NO ₂	CH ₂ OMe	Ms	H
	Me	H	NO ₂	CH ₂ OEt	Ms	H
45	Me	H	NO ₂	CHMeOMe	Ms	H
	Et	H	NO ₂	CH ₂ OMe	Ms	H
	Et	H	NO ₂	CH ₂ OEt	Ms	H
	Et	H	NO ₂	CHMeOMe	Ms	H

50

55

	A	B	X	Y	Z	Q
5	Et	H	NO ₂	CHMeOEt	Ms	H
	Pr-i	H	NO ₂	CH ₂ OMe	Ms	H
	Pr-i	H	NO ₂	CH ₂ OEt	Ms	H
	Pr-i	H	NO ₂	CHMeOMe	Ms	H
10	Me	Me	NO ₂	CH ₂ OMe	Ms	H
	Me	Me	NO ₂	CH ₂ OEt	Ms	H
	Et	Me	NO ₂	CH ₂ OMe	Ms	H
	Et	Me	NO ₂	CH ₂ OEt	Ms	H
	Et	Me	NO ₂	CHMeOMe	Ms	H
15	Pr-i	Me	NO ₂	CH ₂ OMe	Ms	H
	Pr-i	Me	NO ₂	CH ₂ OEt	Ms	H
	Me	H	CF ₃	CH ₂ OMe	Ms	H
	Me	H	CF ₃	CH ₂ OEt	Ms	H
20	Me	H	CF ₃	CHMeOMe	Ms	H
	Et	H	CF ₃	CH ₂ OMe	Ms	H
	Et	H	CF ₃	CH ₂ OEt	Ms	H
	Et	H	CF ₃	CHMeOMe	Ms	H
	Et	H	CF ₃	CHMeOEt	Ms	H
25	Pr-i	H	CF ₃	CH ₂ OMe	Ms	H
	Pr-i	H	CF ₃	CH ₂ OEt	Ms	H
	Pr-i	H	CF ₃	CHMeOMe	Ms	H
	Me	Me	CF ₃	CH ₂ OMe	Ms	H
30	Me	Me	CF ₃	CH ₂ OEt	Ms	H
	Et	Me	CF ₃	CH ₂ OMe	Ms	H
	Et	Me	CF ₃	CH ₂ OEt	Ms	H
	Et	Me	CF ₃	CHMeOMe	Ms	H
	Pr-i	Me	CF ₃	CH ₂ OMe	Ms	H
35	Pr-i	Me	CF ₃	CH ₂ OEt	Ms	H
	Me	H	COCH ₃	CH ₂ OMe	Ms	H
	Me	H	COCH ₃	CH ₂ OEt	Ms	H
	Et	H	COCH ₃	CH ₂ OMe	Ms	H
	Et	H	COCH ₃	CH ₂ OEt	Ms	H
40	Et	H	COCH ₃	CHMeOMe	Ms	H
	Pr-i	H	COCH ₃	CH ₂ OMe	Ms	H
	Pr-i	H	COCH ₃	CH ₂ OEt	Ms	H
	Me	Me	COCH ₃	CH ₂ OMe	Ms	H
45	Et	Me	COCH ₃	CH ₂ OMe	Ms	H
	Et	Me	COCH ₃	CH ₂ OEt	Ms	H
	Pr-i	Me	COCH ₃	CH ₂ OMe	Ms	H
	Me	H	SCH ₃	CH ₂ OMe	Ms	H

50

55

	A	B	X	Y	Z	Q
5	Me	H	SCH ₃	CH ₂ OEt	Ms	H
	Et	H	SCH ₃	CH ₂ OMe	Ms	H
	Et	H	SCH ₃	CH ₂ OEt	Ms	H
10	Et	H	SCH ₃	CHMeOEt	Ms	H
	Pr-i	H	SCH ₃	CH ₂ OMe	Ms	H
	Me	Me	SCH ₃	CH ₂ OMe	Ms	H
	Et	Me	SCH ₃	CH ₂ OMe	Ms	H
	Et	Me	SCH ₃	CH ₂ OEt	Ms	H
15	Pr-i	Me	SCH ₃	CH ₂ OMe	Ms	H
	Me	H	OCHF ₂	CH ₂ OMe	Ms	H
	Me	H	OCHF ₂	CH ₂ OEt	Ms	H
	Et	H	OCHF ₂	CH ₂ OMe	Ms	H
20	Et	H	OCHF ₂	CH ₂ OEt	Ms	H
	Et	H	OCHF ₂	CHMeOEt	Ms	H
	Pr-i	H	OCHF ₂	CH ₂ OMe	Ms	H
	Pr-i	H	OCHF ₂	CH ₂ OEt	Ms	H
	Me	Me	OCHF ₂	CH ₂ OMe	Ms	H
25	Me	Me	OCHF ₂	CH ₂ OEt	Ms	H
	Et	Me	OCHF ₂	CH ₂ OMe	Ms	H
	Et	Me	OCHF ₂	CH ₂ OEt	Ms	H
	Pr-i	Me	OCHF ₂	CH ₂ OMe	Ms	H
	Pr-i	Me	OCHF ₂	CH ₂ OEt	Ms	H
30	Me	H	OCF ₃	CH ₂ OMe	Ms	H
	Me	H	OCF ₃	CH ₂ OEt	Ms	H
	Et	H	OCF ₃	CH ₂ OMe	Ms	H
	Et	H	OCF ₃	CH ₂ OEt	Ms	H
35	Et	H	OCF ₃	CHMeOEt	Ms	H
	Pr-i	H	OCF ₃	CH ₂ OMe	Ms	H
	Pr-i	H	OCF ₃	CH ₂ OEt	Ms	H
	Me	Me	OCF ₃	CH ₂ OMe	Ms	H
	Et	Me	OCF ₃	CH ₂ OMe	Ms	H
40	Et	Me	OCF ₃	CH ₂ OEt	Ms	H
	Pr-i	Me	OCF ₃	CH ₂ OMe	Ms	H
	Me	H	CH ₂ SMe	CH ₂ OMe	Ms	H
	Et	H	CH ₂ SMe	CH ₂ OMe	Ms	H
	Et	H	CH ₂ SMe	CH ₂ OEt	Ms	H
45	Et	H	CH ₂ SMe	CHMeOEt	Ms	H
	Pr-i	H	CH ₂ SMe	CH ₂ OMe	Ms	H
	Pr-i	H	CH ₂ SMe	CHMeOMe	Ms	H
	Me	Me	CH ₂ SMe	CH ₂ OMe	Ms	H
50						
55						

	A	B	X	Y	Z	Q
5	Et	Me	CH ₂ SMe	CH ₂ OMe	Ms	H
	Et	Me	CH ₂ SMe	CH ₂ OE t	Ms	H
	Pr-i	Me	CH ₂ SMe	CH ₂ OMe	Ms	H
10	Me	H	CN	CH ₂ OMe	Ms	H
	Et	H	CN	CH ₂ OMe	Ms	H
	Et	H	CN	CH ₂ OE t	Ms	H
	Pr-i	H	CN	CH ₂ OMe	Ms	H
	Me	Me	CN	CH ₂ OMe	Ms	H
15	Et	Me	CN	CH ₂ OMe	Ms	H
	Pr-i	Me	CN	CH ₂ OMe	Ms	H
	Me	H	CO ₂ Me	CH ₂ OMe	Ms	H
	Et	H	CO ₂ Me	CH ₂ OMe	Ms	H
	Et	H	CO ₂ Me	CH ₂ OE t	Ms	H
20	Pr-i	H	CO ₂ Me	CH ₂ OMe	Ms	H
	Me	Me	CO ₂ Me	CH ₂ OMe	Ms	H
	Et	Me	CO ₂ Me	CH ₂ OMe	Ms	H
	Pr-i	Me	CO ₂ Me	CH ₂ OMe	Ms	H
25	Me	H	CONMe ₂	CH ₂ OMe	Ms	H
	Et	H	CONMe ₂	CH ₂ OMe	Ms	H
	Pr-i	H	CONMe ₂	CH ₂ OMe	Ms	H
	Me	H	Me	CH ₂ OMe	NO ₂	H
	Me	H	Me	CH ₂ OE t	NO ₂	H
30	Et	H	Me	CH ₂ OMe	NO ₂	H
	Et	H	Me	CH ₂ OE t	NO ₂	H
	Et	H	Me	CHMeOMe	NO ₂	H
	Pr-i	H	Me	CH ₂ OMe	NO ₂	H
	Pr-i	H	Me	CH ₂ OE t	NO ₂	H
35	Me	H	Cl	CH ₂ OMe	NO ₂	H
	Me	H	Cl	CH ₂ OE t	NO ₂	H
	Et	H	Cl	CH ₂ OMe	NO ₂	H
	Et	H	Cl	CH ₂ OE t	NO ₂	H
40	Et	H	Cl	CHMeOMe	NO ₂	H
	Pr-i	H	Cl	CH ₂ OMe	NO ₂	H
	Pr-i	H	Cl	CH ₂ OE t	NO ₂	H
	Me	Me	Me	CH ₂ OMe	NO ₂	H
	Et	Me	Me	CH ₂ OMe	NO ₂	H
45	Et	Me	Me	CH ₂ OE t	NO ₂	H
	Pr-i	Me	Me	CH ₂ OMe	NO ₂	H
	Me	Me	Cl	CH ₂ OMe	NO ₂	H
	Et	Me	Cl	CH ₂ OMe	NO ₂	H

50

55

	A	B	X	Y	Z	Q
5	Et	Me	Cl	CH ₂ OEt	NO ₂	H
	Et	Me	Cl	CHMeOMe	NO ₂	H
	Pr-i	Me	Cl	CH ₂ OMe	NO ₂	H
	Me	H	Me	CH ₂ OMe	CF ₃	H
10	Me	H	Me	CH ₂ OEt	CF ₃	H
	Et	H	Me	CH ₂ OMe	CF ₃	H
	Et	H	Me	CH ₂ OEt	CF ₃	H
	Et	H	Me	CHMeOMe	CF ₃	H
15	Pr-i	H	Me	CH ₂ OMe	CF ₃	H
	Pr-i	H	Me	CH ₂ OEt	CF ₃	H
	Me	H	Cl	CH ₂ OMe	CF ₃	H
	Me	H	Cl	CH ₂ OEt	CF ₃	H
	Et	H	Cl	CH ₂ OMe	CF ₃	H
20	Et	H	Cl	CH ₂ OEt	CF ₃	H
	Et	H	Cl	CHMeOMe	CF ₃	H
	Pr-i	H	Cl	CH ₂ OMe	CF ₃	H
	Pr-i	H	Cl	CH ₂ OEt	CF ₃	H
25	Me	Me	Me	CH ₂ OMe	CF ₃	H
	Et	Me	Me	CH ₂ OMe	CF ₃	H
	Et	Me	Me	CH ₂ OEt	CF ₃	H
	Pr-i	Me	Me	CH ₂ OMe	CF ₃	H
	Me	Me	Cl	CH ₂ OMe	CF ₃	H
30	Et	Me	Cl	CH ₂ OMe	CF ₃	H
	Et	Me	Cl	CH ₂ OEt	CF ₃	H
	Et	Me	Cl	CHMeOMe	CF ₃	H
	Pr-i	Me	Cl	CH ₂ OMe	CF ₃	H
35	Me	H	Me	CH ₂ OMe	CN	H
	Me	H	Me	CH ₂ OEt	CN	H
	Et	H	Me	CH ₂ OMe	CN	H
	Et	H	Me	CH ₂ OEt	CN	H
	Et	H	Me	CHMeOMe	CN	H
40	Pr-i	H	Me	CH ₂ OMe	CN	H
	Pr-i	H	Me	CH ₂ OEt	CN	H
	Me	H	Cl	CH ₂ OMe	CN	H
	Me	H	Cl	CH ₂ OEt	CN	H
45	Et	H	Cl	CH ₂ OMe	CN	H
	Et	H	Cl	CH ₂ OEt	CN	H
	Et	H	Cl	CHMeOMe	CN	H
	Pr-i	H	Cl	CH ₂ OMe	CN	H
	Pr-i	H	Cl	CH ₂ OEt	CN	H

50

55

	A	B	X	Y	Z	Q
5	Me	Me	Me	CH ₂ OMe	CN	H
	Et	Me	Me	CH ₂ OMe	CN	H
	Et	Me	Me	CH ₂ OEt	CN	H
	Pr-i	Me	Me	CH ₂ OMe	CN	H
10	Me	Me	Cl	CH ₂ OMe	CN	H
	Et	Me	Cl	CH ₂ OMe	CN	H
	Et	Me	Cl	CH ₂ OEt	CN	H
	Et	Me	Cl	CHMeOMe	CN	H
	Pr-i	Me	Cl	CH ₂ OMe	CN	H
15	Me	H	Me	CH ₂ OMe	OMe	H
	Me	H	Me	CH ₂ OEt	OMe	H
	Et	H	Me	CH ₂ OMe	OMe	H
	Et	H	Me	CH ₂ OEt	OMe	H
	Et	H	Me	CHMeOMe	OMe	H
20	Pr-i	H	Me	CH ₂ OMe	OMe	H
	Pr-i	H	Me	CH ₂ OEt	OMe	H
	Me	H	Cl	CH ₂ OMe	OMe	H
	Me	H	Cl	CH ₂ OEt	OMe	H
25	Et	H	Cl	CH ₂ OMe	OMe	H
	Et	H	Cl	CH ₂ OEt	OMe	H
	Et	H	Cl	CHMeOMe	OMe	H
	Pr-i	H	Cl	CH ₂ OMe	OMe	H
	Pr-i	H	Cl	CH ₂ OEt	OMe	H
30	Me	Me	Me	CH ₂ OMe	OMe	H
	Et	Me	Me	CH ₂ OMe	OMe	H
	Et	Me	Me	CH ₂ OEt	OMe	H
	Pr-i	Me	Me	CH ₂ OMe	OMe	H
35	Me	Me	Cl	CH ₂ OMe	OMe	H
	Et	Me	Cl	CH ₂ OMe	OMe	H
	Et	Me	Cl	CH ₂ OEt	OMe	H
	Et	Me	Cl	CHMeOMe	OMe	H
	Pr-i	Me	Cl	CH ₂ OMe	OMe	H
40	Me	H	Me	CH ₂ OMe	Br	H
	Me	H	Me	CH ₂ OEt	Br	H
	Et	H	Me	CH ₂ OMe	Br	H
	Et	H	Me	CH ₂ OEt	Br	H
	Et	H	Me	CHMeOMe	Br	H
45	Pr-i	H	Me	CH ₂ OMe	Br	H
	Pr-i	H	Me	CH ₂ OEt	Br	H
	Me	H	Cl	CH ₂ OMe	Br	H

50

55

	A	B	X	Y	Z	Q
5	Me	H	Cl	CH ₂ OEt	Br	H
	Et	H	Cl	CH ₂ OMe	Br	H
	Et	H	Cl	CH ₂ OEt	Br	H
	Et	H	Cl	CHMeOMe	Br	H
10	Pr-i	H	Cl	CH ₂ OMe	Br	H
	Pr-i	H	Cl	CH ₂ OEt	Br	H
	Me	Me	Me	CH ₂ OMe	Br	H
	Et	Me	Me	CH ₂ OMe	Br	H
	Et	Me	Me	CH ₂ OEt	Br	H
15	Pr-i	Me	Me	CH ₂ OMe	Br	H
	Me	Me	Cl	CH ₂ OMe	Br	H
	Et	Me	Cl	CH ₂ OMe	Br	H
	Et	Me	Cl	CH ₂ OEt	Br	H
20	Et	Me	Cl	CHMeOMe	Br	H
	Pr-i	Me	Cl	CH ₂ OMe	Br	H
	Me	H	Me	CH ₂ OMe	I	H
	Me	H	Me	CH ₂ OEt	I	H
25	Et	H	Me	CH ₂ OMe	I	H
	Et	H	Me	CH ₂ OEt	I	H
	Et	H	Me	CHMeOMe	I	H
	Pr-i	H	Me	CH ₂ OMe	I	H
	Pr-i	H	Me	CH ₂ OEt	I	H
30	Me	H	Cl	CH ₂ OMe	I	H
	Me	H	Cl	CH ₂ OEt	I	H
	Et	H	Cl	CH ₂ OMe	I	H
	Et	H	Cl	CH ₂ OEt	I	H
	Et	H	Cl	CHMeOMe	I	H
35	Pr-i	H	Cl	CH ₂ OMe	I	H
	Pr-i	H	Cl	CH ₂ OEt	I	H
	Me	Me	Me	CH ₂ OMe	I	H
	Et	Me	Me	CH ₂ OMe	I	H
	Et	Me	Me	CH ₂ OEt	I	H
40	Pr-i	Me	Me	CH ₂ OMe	I	H
	Me	Me	Cl	CH ₂ OMe	I	H
	Et	Me	Cl	CH ₂ OMe	I	H
	Et	Me	Cl	CH ₂ OEt	I	H
45	Et	Me	Cl	CHMeOMe	I	H
	Pr-i	Me	Cl	CH ₂ OMe	I	H
	Me	H	Me	CH ₂ OMe	SCF ₃	H
	Me	H	Me	CH ₂ OEt	SCF ₃	H
50						
55						

	A	B	X	Y	Z	Q
5	Et	H	Me	CH ₂ OMe	SCF ₃	H
	Et	H	Me	CH ₂ OEt	SCF ₃	H
	Et	H	Me	CHMeOMe	SCF ₃	H
10	Pr-i	H	Me	CH ₂ OMe	SCF ₃	H
	Pr-i	H	Me	CH ₂ OEt	SCF ₃	H
	Me	H	Cl	CH ₂ OMe	SCF ₃	H
	Me	H	Cl	CH ₂ OEt	SCF ₃	H
	Et	H	Cl	CH ₂ OMe	SCF ₃	H
15	Et	H	Cl	CH ₂ OEt	SCF ₃	H
	Et	H	Cl	CHMeOMe	SCF ₃	H
	Pr-i	H	Cl	CH ₂ OMe	SCF ₃	H
	Pr-i	H	Cl	CH ₂ OEt	SCF ₃	H
20	Me	Me	Me	CH ₂ OMe	SCF ₃	H
	Et	Me	Me	CH ₂ OMe	SCF ₃	H
	Et	Me	Me	CH ₂ OEt	SCF ₃	H
	Pr-i	Me	Me	CH ₂ OMe	SCF ₃	H
	Me	Me	Cl	CH ₂ OMe	SCF ₃	H
25	Et	Me	Cl	CH ₂ OMe	SCF ₃	H
	Et	Me	Cl	CH ₂ OEt	SCF ₃	H
	Et	Me	Cl	CHMeOMe	SCF ₃	H
	Pr-i	Me	Cl	CH ₂ OMe	SCF ₃	H
	Me	H	Me	CH ₂ OMe	SO ₂ CF ₃	H
30	Me	H	Me	CH ₂ OEt	SO ₂ CF ₃	H
	Et	H	Me	CH ₂ OMe	SO ₂ CF ₃	H
	Et	H	Me	CH ₂ OEt	SO ₂ CF ₃	H
	Et	H	Me	CHMeOMe	SO ₂ CF ₃	H
35	Pr-i	H	Me	CH ₂ OMe	SO ₂ CF ₃	H
	Pr-i	H	Me	CH ₂ OEt	SO ₂ CF ₃	H
	Me	H	Cl	CH ₂ OMe	SO ₂ CF ₃	H
	Me	H	Cl	CH ₂ OEt	SO ₂ CF ₃	H
	Et	H	Cl	CH ₂ OMe	SO ₂ CF ₃	H
40	Et	H	Cl	CH ₂ OEt	SO ₂ CF ₃	H
	Et	H	Cl	CHMeOMe	SO ₂ CF ₃	H
	Pr-i	H	Cl	CH ₂ OMe	SO ₂ CF ₃	H
	Pr-i	H	Cl	CH ₂ OEt	SO ₂ CF ₃	H
	Me	Me	Me	CH ₂ OMe	SO ₂ CF ₃	H
45	Et	Me	Me	CH ₂ OMe	SO ₂ CF ₃	H
	Et	Me	Me	CH ₂ OEt	SO ₂ CF ₃	H
	Pr-i	Me	Me	CH ₂ OMe	SO ₂ CF ₃	H
	Me	Me	Cl	CH ₂ OMe	SO ₂ CF ₃	H

50

55

	A	B	X	Y	Z	Q
5	Et	Me	Cl	CH ₂ OMe	SO ₂ CF ₃	H
	Et	Me	Cl	CH ₂ OEt	SO ₂ CF ₃	H
	Et	Me	Cl	CHMeOMe	SO ₂ CF ₃	H
	Pr-i	Me	Cl	CH ₂ OMe	SO ₂ CF ₃	H

10

15

20

25

30

35

40

45

50

55

	A	B	X	Y	Z	Q
5	Me	H	Me	COOMe	Ms	Na
	Me	H	Me	COOMe	Ms	K
	Me	H	Me	COOMe	Ms	Ca _{1/2}
	Me	H	Me	COOMe	Ms	Mg _{1/2}
10	Me	H	Me	COOMe	Ms	EtN ⁺ H ₃
	Me	H	Me	COOMe	Ms	i-PrN ⁺ H ₃
	Me	H	Me	COOMe	Ms	Et ₂ N ⁺ H ₂
	Me	H	Me	COOMe	Ms	Me ₃ N ⁺ CH ₂ CH ₂ OH
	Et	H	Me	COOMe	Ms	Na
15	Et	H	Me	COOMe	Ms	K
	Et	H	Me	COOMe	Ms	Ca _{1/2}
	Et	H	Me	COOMe	Ms	Mg _{1/2}
	Et	H	Me	COOMe	Ms	EtN ⁺ H ₃
20	Et	H	Me	COOMe	Ms	i-PrN ⁺ H ₃
	Et	H	Me	COOMe	Ms	Et ₂ N ⁺ H ₂
	Et	H	Me	COOMe	Ms	Me ₃ N ⁺ CH ₂ CH ₂ OH
	i-Pr	H	Me	COOMe	Ms	Na
	i-Pr	H	Me	COOMe	Ms	K
25	i-Pr	H	Me	COOMe	Ms	Ca _{1/2}
	i-Pr	H	Me	COOMe	Ms	Mg _{1/2}
	i-Pr	H	Me	COOMe	Ms	EtN ⁺ H ₃
	i-Pr	H	Me	COOMe	Ms	i-PrN ⁺ H ₃
	i-Pr	H	Me	COOMe	Ms	Et ₂ N ⁺ H ₂
30	i-Pr	H	Me	COOMe	Ms	Me ₃ N ⁺ CH ₂ CH ₂ OH
	Me	Me	Me	COOMe	Ms	i-PrN ⁺ H ₃
	Et	Me	Me	COOMe	Ms	Na
	Et	Me	Me	COOMe	Ms	i-PrN ⁺ H ₃
35	i-Pr	Me	Me	COOMe	Ms	i-PrN ⁺ H ₃
	Me	H	Cl	COOMe	Ms	Na
	Me	H	Cl	COOMe	Ms	K
	Me	H	Cl	COOMe	Ms	Ca _{1/2}
	Me	H	Cl	COOMe	Ms	Mg _{1/2}
40	Me	H	Cl	COOMe	Ms	EtN ⁺ H ₃
	Me	H	Cl	COOMe	Ms	i-PrN ⁺ H ₃
	Me	H	Cl	COOMe	Ms	Et ₂ N ⁺ H ₂
	Me	H	Cl	COOMe	Ms	Me ₃ N ⁺ CH ₂ CH ₂ OH
	Et	H	Cl	COOMe	Ms	Na
45	Et	H	Cl	COOMe	Ms	K
	Et	H	Cl	COOMe	Ms	Ca _{1/2}
	Et	H	Cl	COOMe	Ms	Mg _{1/2}

50

55

	A	B	X	Y	Z	Q
5	Et	H	Cl	COOMe	Ms	EtN ⁺ H ₃
	Et	H	Cl	COOMe	Ms	i-PrN ⁺ H ₃
	Et	H	Cl	COOMe	Ms	Et ₂ N ⁺ H ₂
	Et	H	Cl	COOMe	Ms	Me ₃ N ⁺ CH ₂ CH ₂ OH
10	i-Pr	H	Cl	COOMe	Ms	Na
	i-Pr	H	Cl	COOMe	Ms	K
	i-Pr	H	Cl	COOMe	Ms	Ca _{1/2}
	i-Pr	H	Cl	COOMe	Ms	Mg _{1/2}
15	i-Pr	H	Cl	COOMe	Ms	EtN ⁺ H ₃
	i-Pr	H	Cl	COOMe	Ms	i-PrN ⁺ H ₃
	i-Pr	H	Cl	COOMe	Ms	Et ₂ N ⁺ H ₂
	i-Pr	H	Cl	COOMe	Ms	Me ₃ N ⁺ CH ₂ CH ₂ OH
	Me	Me	Cl	COOMe	Ms	i-PrN ⁺ H ₃
20	Et	Me	Cl	COOMe	Ms	Na
	Et	Me	Cl	COOMe	Ms	i-PrN ⁺ H ₃
	i-Pr	Me	Cl	COOMe	Ms	i-PrN ⁺ H ₃
	Me	H	OMe	COOMe	Ms	Na
	Me	H	OMe	COOMe	Ms	K
25	Me	H	OMe	COOMe	Ms	Ca _{1/2}
	Me	H	OMe	COOMe	Ms	Mg _{1/2}
	Me	H	OMe	COOMe	Ms	EtN ⁺ H ₃
	Me	H	OMe	COOMe	Ms	i-PrN ⁺ H ₃
30	Me	H	OMe	COOMe	Ms	Et ₂ N ⁺ H ₂
	Me	H	OMe	COOMe	Ms	Me ₃ N ⁺ CH ₂ CH ₂ OH
	Et	H	OMe	COOMe	Ms	Na
	Et	H	OMe	COOMe	Ms	K
	Et	H	OMe	COOMe	Ms	Ca _{1/2}
35	Et	H	OMe	COOMe	Ms	Mg _{1/2}
	Et	H	OMe	COOMe	Ms	EtN ⁺ H ₃
	Et	H	OMe	COOMe	Ms	i-PrN ⁺ H ₃
	Et	H	OMe	COOMe	Ms	Et ₂ N ⁺ H ₂
	Et	H	OMe	COOMe	Ms	Me ₃ N ⁺ CH ₂ CH ₂ OH
40	i-Pr	H	OMe	COOMe	Ms	Na
	i-Pr	H	OMe	COOMe	Ms	K
	i-Pr	H	OMe	COOMe	Ms	Ca _{1/2}
	i-Pr	H	OMe	COOMe	Ms	Mg _{1/2}
45	i-Pr	H	OMe	COOMe	Ms	EtN ⁺ H ₃
	i-Pr	H	OMe	COOMe	Ms	i-PrN ⁺ H ₃
	i-Pr	H	OMe	COOMe	Ms	Et ₂ N ⁺ H ₂
	i-Pr	H	OMe	COOMe	Ms	Me ₃ N ⁺ CH ₂ CH ₂ OH

50

55

	A	E	X	Y	Z	Q
5	Et	Me	OMe	COOMe	Ms	i-PrN ⁺ H ₃
	Me	H	Me	COOEt	Ms	Na
	Me	H	Me	COOEt	Ms	K
10	Me	H	Me	COOEt	Ms	Ca _{1/2}
	Me	H	Me	COOEt	Ms	Mg _{1/2}
	Me	H	Me	COOEt	Ms	EtN ⁺ H ₃
	Me	H	Me	COOEt	Ms	i-PrN ⁺ H ₃
	Me	H	Me	COOEt	Ms	Et ₂ N ⁺ H ₂
15	Me	H	Me	COOEt	Ms	Me ₃ N ⁺ CH ₂ CH ₂ OH
	Et	H	Me	COOEt	Ms	Na
	Et	H	Me	COOEt	Ms	K
	Et	H	Me	COOEt	Ms	Ca _{1/2}
20	Et	H	Me	COOEt	Ms	Mg _{1/2}
	Et	H	Me	COOEt	Ms	EtN ⁺ H ₃
	Et	H	Me	COOEt	Ms	i-PrN ⁺ H ₃
	Et	H	Me	COOEt	Ms	Et ₂ N ⁺ H ₂
	Et	H	Me	COOEt	Ms	Me ₃ N ⁺ CH ₂ CH ₂ OH
25	i-Pr	H	Me	COOEt	Ms	Na
	i-Pr	H	Me	COOEt	Ms	K
	i-Pr	H	Me	COOEt	Ms	Ca _{1/2}
	i-Pr	H	Me	COOEt	Ms	Mg _{1/2}
	i-Pr	H	Me	COOEt	Ms	EtN ⁺ H ₃
30	i-Pr	H	Me	COOEt	Ms	i-PrN ⁺ H ₃
	i-Pr	H	Me	COOEt	Ms	Et ₂ N ⁺ H ₂
	i-Pr	H	Me	COOEt	Ms	Me ₃ N ⁺ CH ₂ CH ₂ OH
	Me	Me	Me	COOEt	Ms	i-PrN ⁺ H ₃
35	Et	Me	Me	COOEt	Ms	Na
	Et	Me	Me	COOEt	Ms	i-PrN ⁺ H ₃
	i-Pr	Me	Me	COOEt	Ms	i-PrN ⁺ H ₃
	Me	H	Cl	COOEt	Ms	Na
	Me	H	Cl	COOEt	Ms	K
40	Me	H	Cl	COOEt	Ms	Ca _{1/2}
	Me	H	Cl	COOEt	Ms	Mg _{1/2}
	Me	H	Cl	COOEt	Ms	EtN ⁺ H ₃
	Me	H	Cl	COOEt	Ms	i-PrN ⁺ H ₃
	Me	H	Cl	COOEt	Ms	Et ₂ N ⁺ H ₂
45	Me	H	Cl	COOEt	Ms	Me ₃ N ⁺ CH ₂ CH ₂ OH
	Et	H	Cl	COOEt	Ms	Na
	Et	H	Cl	COOEt	Ms	K
	Et	H	Cl	COOEt	Ms	Ca _{1/2}

50

55

	A	E	X	Y	Z	Q
5	Et	H	Cl	COOEt	Ms	Mg _{1/2}
	Et	H	Cl	COOEt	Ms	EtN ⁺ H ₃
	Et	H	Cl	COOEt	Ms	i-PrN ⁺ H ₃
	Et	H	Cl	COOEt	Ms	Et ₂ N ⁺ H ₂
10	Et	H	Cl	COOEt	Ms	Me ₃ N ⁺ CH ₂ CH ₂ OH
	i-Pr	H	Cl	COOEt	Ms	Na
	i-Pr	H	Cl	COOEt	Ms	K
	i-Pr	H	Cl	COOEt	Ms	Ca _{1/2}
15	i-Pr	H	Cl	COOEt	Ms	Mg _{1/2}
	i-Pr	H	Cl	COOEt	Ms	EtN ⁺ H ₃
	i-Pr	H	Cl	COOEt	Ms	i-PrN ⁺ H ₃
	i-Pr	H	Cl	COOEt	Ms	Et ₂ N ⁺ H ₂
	i-Pr	H	Cl	COOEt	Ms	Me ₃ N ⁺ CH ₂ CH ₂ OH
20	Me	Me	Cl	COOEt	Ms	i-PrN ⁺ H ₃
	Et	Me	Cl	COOEt	Ms	Na
	Et	Me	Cl	COOEt	Ms	i-PrN ⁺ H ₃
	i-Pr	Me	Cl	COOEt	Ms	i-PrN ⁺ H ₃
25	Me	H	OMe	COOEt	Ms	Na
	Me	H	OMe	COOEt	Ms	K
	Me	H	OMe	COOEt	Ms	Ca _{1/2}
	Me	H	OMe	COOEt	Ms	Mg _{1/2}
	Me	H	OMe	COOEt	Ms	EtN ⁺ H ₃
30	Me	H	OMe	COOEt	Ms	i-PrN ⁺ H ₃
	Me	H	OMe	COOEt	Ms	Et ₂ N ⁺ H ₂
	Me	H	OMe	COOEt	Ms	Me ₃ N ⁺ CH ₂ CH ₂ OH
	Et	H	OMe	COOEt	Ms	Na
	Et	H	OMe	COOEt	Ms	K
35	Et	H	OMe	COOEt	Ms	Ca _{1/2}
	Et	H	OMe	COOEt	Ms	Mg _{1/2}
	Et	H	OMe	COOEt	Ms	EtN ⁺ H ₃
	Et	H	OMe	COOEt	Ms	i-PrN ⁺ H ₃
	Et	H	OMe	COOEt	Ms	Et ₂ N ⁺ H ₂
40	Et	H	OMe	COOEt	Ms	Me ₃ N ⁺ CH ₂ CH ₂ OH
	i-Pr	H	OMe	COOEt	Ms	Na
	i-Pr	H	OMe	COOEt	Ms	K
	i-Pr	H	OMe	COOEt	Ms	Ca _{1/2}
45	i-Pr	H	OMe	COOEt	Ms	Mg _{1/2}
	i-Pr	H	OMe	COOEt	Ms	EtN ⁺ H ₃
	i-Pr	H	OMe	COOEt	Ms	i-PrN ⁺ H ₃
	i-Pr	H	OMe	COOEt	Ms	Et ₂ N ⁺ H ₂

50

55

	A	B	X	Y	Z	Q
5	i-Pr	H	OMe	COOEt	Ms	Me ₃ N ⁺ CH ₂ CH ₂ OH
	Et	Me	OMe	COOEt	Ms	i-Pr-N ⁺ H ₃
	Me	H	Me	COOPr-i	Ms	Na
	Me	H	Me	COOPr-i	Ms	K
10	Me	H	Me	COOPr-i	Ms	Ca _{1/2}
	Me	H	Me	COOPr-i	Ms	Mg _{1/2}
	Me	H	Me	COOPr-i	Ms	EtN ⁺ H ₃
	Me	H	Me	COOPr-i	Ms	i-PrN ⁺ H ₃
15	Me	H	Me	COOPr-i	Ms	Et ₂ N ⁺ H ₂
	Me	H	Me	COOPr-i	Ms	Me ₃ N ⁺ CH ₂ CH ₂ OH
	Et	H	Me	COOPr-i	Ms	Na
	Et	H	Me	COOPr-i	Ms	K
	Et	H	Me	COOPr-i	Ms	Ca _{1/2}
20	Et	H	Me	COOPr-i	Ms	Mg _{1/2}
	Et	H	Me	COOPr-i	Ms	EtN ⁺ H ₃
	Et	H	Me	COOPr-i	Ms	i-PrN ⁺ H ₃
	Et	H	Me	COOPr-i	Ms	Et ₂ N ⁺ H ₂
	Et	H	Me	COOPr-i	Ms	Me ₃ N ⁺ CH ₂ CH ₂ OH
25	i-Pr	H	Me	COOPr-i	Ms	Na
	i-Pr	H	Me	COOPr-i	Ms	K
	i-Pr	H	Me	COOPr-i	Ms	Ca _{1/2}
	i-Pr	H	Me	COOPr-i	Ms	Mg _{1/2}
30	i-Pr	H	Me	COOPr-i	Ms	EtN ⁺ H ₃
	i-Pr	H	Me	COOPr-i	Ms	i-PrN ⁺ H ₃
	i-Pr	H	Me	COOPr-i	Ms	Et ₂ N ⁺ H ₂
	i-Pr	H	Me	COOPr-i	Ms	Me ₃ N ⁺ CH ₂ CH ₂ OH
	Me	Me	Me	COOPr-i	Ms	i-PrN ⁺ H ₃
35	Et	Me	Me	COOPr-i	Ms	Na
	Et	Me	Me	COOPr-i	Ms	i-PrN ⁺ H ₃
	i-Pr	Me	Me	COOPr-i	Ms	i-PrN ⁺ H ₃
	Me	H	Cl	COOPr-i	Ms	Na
40	Me	H	Cl	COOPr-i	Ms	K
	Me	H	Cl	COOPr-i	Ms	Ca _{1/2}
	Me	H	Cl	COOPr-i	Ms	Mg _{1/2}
	Me	H	Cl	COOPr-i	Ms	EtN ⁺ H ₃
	Me	H	Cl	COOPr-i	Ms	i-PrN ⁺ H ₃
45	Me	H	Cl	COOPr-i	Ms	Et ₂ N ⁺ H ₂
	Me	H	Cl	COOPr-i	Ms	Me ₃ N ⁺ CH ₂ CH ₂ OH
	Et	H	Cl	COOPr-i	Ms	Na
	Et	H	Cl	COOPr-i	Ms	K

50

55

	A	B	X	Y	Z	Q
5	Et	H	Cl	COOP _r -i	Ms	Ca _{1/2}
	Et	H	Cl	COOP _r -i	Ms	Mg _{1/2}
	Et	H	Cl	COOP _r -i	Ms	EtN ⁺ H ₃
	Et	H	Cl	COOP _r -i	Ms	i-PrN ⁺ H ₃
10	Et	H	Cl	COOP _r -i	Ms	Et ₂ N ⁺ H ₂
	Et	H	Cl	COOP _r -i	Ms	Me ₃ N ⁺ CH ₂ CH ₂ OH
	i-Pr	H	Cl	COOP _r -i	Ms	Na
	i-Pr	H	Cl	COOP _r -i	Ms	K
15	i-Pr	H	Cl	COOP _r -i	Ms	Ca _{1/2}
	i-Pr	H	Cl	COOP _r -i	Ms	Mg _{1/2}
	i-Pr	H	Cl	COOP _r -i	Ms	EtN ⁺ H ₃
	i-Pr	H	Cl	COOP _r -i	Ms	i-PrN ⁺ H ₃
	i-Pr	H	Cl	COOP _r -i	Ms	Et ₂ N ⁺ H ₂
20	i-Pr	H	Cl	COOP _r -i	Ms	Me ₃ N ⁺ CH ₂ CH ₂ OH
	Me	Me	Cl	COOP _r -i	Ms	i-PrN ⁺ H ₃
	Et	Me	Cl	COOP _r -i	Ms	Na
	Et	Me	Cl	COOP _r -i	Ms	i-PrN ⁺ H ₃
	i-Pr	Me	Cl	COOP _r -i	Ms	i-PrN ⁺ H ₃
25	Me	H	OMe	COOP _r -i	Ms	Na
	Me	H	OMe	COOP _r -i	Ms	K
	Me	H	OMe	COOP _r -i	Ms	Ca _{1/2}
	Me	H	OMe	COOP _r -i	Ms	Mg _{1/2}
30	Me	H	OMe	COOP _r -i	Ms	EtN ⁺ H ₃
	Me	H	OMe	COOP _r -i	Ms	i-PrN ⁺ H ₃
	Me	H	OMe	COOP _r -i	Ms	Et ₂ N ⁺ H ₂
	Me	H	OMe	COOP _r -i	Ms	Me ₃ N ⁺ CH ₂ CH ₂ OH
	Et	H	OMe	COOP _r -i	Ms	Na
35	Et	H	OMe	COOP _r -i	Ms	K
	Et	H	OMe	COOP _r -i	Ms	Ca _{1/2}
	Et	H	OMe	COOP _r -i	Ms	Mg _{1/2}
	Et	H	OMe	COOP _r -i	Ms	EtN ⁺ H ₃
	Et	H	OMe	COOP _r -i	Ms	i-PrN ⁺ H ₃
40	Et	H	OMe	COOP _r -i	Ms	Et ₂ N ⁺ H ₂
	Et	H	OMe	COOP _r -i	Ms	Me ₃ N ⁺ CH ₂ CH ₂ OH
	i-Pr	H	OMe	COOP _r -i	Ms	Na
	i-Pr	H	OMe	COOP _r -i	Ms	K
45	i-Pr	H	OMe	COOP _r -i	Ms	Ca _{1/2}
	i-Pr	H	OMe	COOP _r -i	Ms	Mg _{1/2}
	i-Pr	H	OMe	COOP _r -i	Ms	EtN ⁺ H ₃
	i-Pr	H	OMe	COOP _r -i	Ms	i-PrN ⁺ H ₃

50

55

	A	B	X	Y	Z	Q
5	i-Pr	H	OMe	COOPr-i	Ms	Et ₂ N ⁺ H ₂
	i-Pr	H	OMe	COOPr-i	Ms	Me ₃ N ⁺ CH ₂ CH ₂ OH
	Et	Me	OMe	COOPr-i	Ms	i-PrN ⁺ H ₃
10	Me	H	Me	COOCH ₂ CH ₂ OMe	Ms	Na
	Me	H	Me	COOCH ₂ CH ₂ OMe	Ms	K
	Me	H	Me	COOCH ₂ CH ₂ OMe	Ms	Ca _{1/2}
	Me	H	Me	COOCH ₂ CH ₂ OMe	Ms	Mg _{1/2}
	Me	H	Me	COOCH ₂ CH ₂ OMe	Ms	EtN ⁺ H ₃
15	Me	H	Me	COOCH ₂ CH ₂ OMe	Ms	i-PrN ⁺ H ₃
	Me	H	Me	COOCH ₂ CH ₂ OMe	Ms	Et ₂ N ⁺ H ₂
	Me	H	Me	COOCH ₂ CH ₂ OMe	Ms	Me ₃ N ⁺ CH ₂ CH ₂ OH
	Et	H	Me	COOCH ₂ CH ₂ OMe	Ms	Na
	Et	H	Me	COOCH ₂ CH ₂ OMe	Ms	K
20	Et	H	Me	COOCH ₂ CH ₂ OMe	Ms	Ca _{1/2}
	Et	H	Me	COOCH ₂ CH ₂ OMe	Ms	Mg _{1/2}
	Et	H	Me	COOCH ₂ CH ₂ OMe	Ms	EtN ⁺ H ₃
	Et	H	Me	COOCH ₂ CH ₂ OMe	Ms	i-PrN ⁺ H ₃
25	Et	H	Me	COOCH ₂ CH ₂ OMe	Ms	Et ₂ N ⁺ H ₂
	Et	H	Me	COOCH ₂ CH ₂ OMe	Ms	Me ₃ N ⁺ CH ₂ CH ₂ OH
	i-Pr	H	Me	COOCH ₂ CH ₂ OMe	Ms	Na
	i-Pr	H	Me	COOCH ₂ CH ₂ OMe	Ms	K
30	i-Pr	H	Me	COOCH ₂ CH ₂ OMe	Ms	Ca _{1/2}
	i-Pr	H	Me	COOCH ₂ CH ₂ OMe	Ms	Mg _{1/2}
	i-Pr	H	Me	COOCH ₂ CH ₂ OMe	Ms	EtN ⁺ H ₃
	i-Pr	H	Me	COOCH ₂ CH ₂ OMe	Ms	i-PrN ⁺ H ₃
	i-Pr	H	Me	COOCH ₂ CH ₂ OMe	Ms	Et ₂ N ⁺ H ₂
35	i-Pr	H	Me	COOCH ₂ CH ₂ OMe	Ms	Me ₃ N ⁺ CH ₂ CH ₂ OH
	Me	Me	Me	COOCH ₂ CH ₂ OMe	Ms	i-PrN ⁺ H ₃
	Et	Me	Me	COOCH ₂ CH ₂ OMe	Ms	Na
	Et	Me	Me	COOCH ₂ CH ₂ OMe	Ms	i-PrN ⁺ H ₃
	i-Pr	Me	Me	COOCH ₂ CH ₂ OMe	Ms	i-PrN ⁺ H ₃
40	Me	H	Cl	COOCH ₂ CH ₂ OMe	Ms	Na
	Me	H	Cl	COOCH ₂ CH ₂ OMe	Ms	K
	Me	H	Cl	COOCH ₂ CH ₂ OMe	Ms	Ca _{1/2}
	Me	H	Cl	COOCH ₂ CH ₂ OMe	Ms	Mg _{1/2}
	Me	H	Cl	COOCH ₂ CH ₂ OMe	Ms	EtN ⁺ H ₃
45	Me	H	Cl	COOCH ₂ CH ₂ OMe	Ms	i-PrN ⁺ H ₃
	Me	H	Cl	COOCH ₂ CH ₂ OMe	Ms	Et ₂ N ⁺ H ₂
	Me	H	Cl	COOCH ₂ CH ₂ OMe	Ms	Me ₃ N ⁺ CH ₂ CH ₂ OH
	Et	H	Cl	COOCH ₂ CH ₂ OMe	Ms	Na

50

55

	A	B	X	Y	Z	Q
5	Et	H	Cl	COOCH ₂ CH ₂ OMe	Ms	K
	Et	H	Cl	COOCH ₂ CH ₂ OMe	Ms	Ca _{1/2}
	Et	H	Cl	COOCH ₂ CH ₂ OMe	Ms	Mg _{1/2}
10	Et	H	Cl	COOCH ₂ CH ₂ OMe	Ms	EtN ⁺ H ₃
	Et	H	Cl	COOCH ₂ CH ₂ OMe	Ms	i-PrN ⁺ H ₃
	Et	H	Cl	COOCH ₂ CH ₂ OMe	Ms	Et ₂ N ⁺ H ₂
	Et	H	Cl	COOCH ₂ CH ₂ OMe	Ms	Me ₃ N ⁺ CH ₂ CH ₂ OH
	i-Pr	H	Cl	COOCH ₂ CH ₂ OMe	Ms	Na
15	i-Pr	H	Cl	COOCH ₂ CH ₂ OMe	Ms	K
	i-Pr	H	Cl	COOCH ₂ CH ₂ OMe	Ms	Ca _{1/2}
	i-Pr	H	Cl	COOCH ₂ CH ₂ OMe	Ms	Mg _{1/2}
	i-Pr	H	Cl	COOCH ₂ CH ₂ OMe	Ms	EtN ⁺ H ₃
20	i-Pr	H	Cl	COOCH ₂ CH ₂ OMe	Ms	i-PrN ⁺ H ₃
	i-Pr	H	Cl	COOCH ₂ CH ₂ OMe	Ms	Et ₂ N ⁺ H ₂
	i-Pr	H	Cl	COOCH ₂ CH ₂ OMe	Ms	Me ₃ N ⁺ CH ₂ CH ₂ OH
	Me	Me	Cl	COOCH ₂ CH ₂ OMe	Ms	i-PrN ⁺ H ₃
	Et	Me	Cl	COOCH ₂ CH ₂ OMe	Ms	Na
25	Et	Me	Cl	COOCH ₂ CH ₂ OMe	Ms	i-PrN ⁺ H ₃
	i-Pr	Me	Cl	COOCH ₂ CH ₂ OMe	Ms	i-PrN ⁺ H ₃
	Me	H	OMe	COOCH ₂ CH ₂ OMe	Ms	Na
	Me	H	OMe	COOCH ₂ CH ₂ OMe	Ms	K
	Me	H	OMe	COOCH ₂ CH ₂ OMe	Ms	Ca _{1/2}
30	Me	H	OMe	COOCH ₂ CH ₂ OMe	Ms	Mg _{1/2}
	Me	H	OMe	COOCH ₂ CH ₂ OMe	Ms	EtN ⁺ H ₃
	Me	H	OMe	COOCH ₂ CH ₂ OMe	Ms	i-PrN ⁺ H ₃
	Me	H	OMe	COOCH ₂ CH ₂ OMe	Ms	Et ₂ N ⁺ H ₂
35	Me	H	OMe	COOCH ₂ CH ₂ OMe	Ms	Me ₃ N ⁺ CH ₂ CH ₂ OH
	Et	H	OMe	COOCH ₂ CH ₂ OMe	Ms	Na
	Et	H	OMe	COOCH ₂ CH ₂ OMe	Ms	K
	Et	H	OMe	COOCH ₂ CH ₂ OMe	Ms	Ca _{1/2}
	Et	H	OMe	COOCH ₂ CH ₂ OMe	Ms	Mg _{1/2}
40	Et	H	OMe	COOCH ₂ CH ₂ OMe	Ms	EtN ⁺ H ₃
	Et	H	OMe	COOCH ₂ CH ₂ OMe	Ms	i-PrN ⁺ H ₃
	Et	H	OMe	COOCH ₂ CH ₂ OMe	Ms	Et ₂ N ⁺ H ₂
	Et	H	OMe	COOCH ₂ CH ₂ OMe	Ms	Me ₃ N ⁺ CH ₂ CH ₂ OH
	i-Pr	H	OMe	COOCH ₂ CH ₂ OMe	Ms	Na
45	i-Pr	H	OMe	COOCH ₂ CH ₂ OMe	Ms	K
	i-Pr	H	OMe	COOCH ₂ CH ₂ OMe	Ms	Ca _{1/2}
	i-Pr	H	OMe	COOCH ₂ CH ₂ OMe	Ms	Mg _{1/2}
	i-Pr	H	OMe	COOCH ₂ CH ₂ OMe	Ms	EtN ⁺ H ₃
50						
55						

	A	B	X	Y	Z	Q
5	i-Pr	H	OMe	COOCH ₂ CH ₂ OMe	Ms	i-PrN ⁺ H ₃
	i-Pr	H	OMe	COOCH ₂ CH ₂ OMe	Ms	Et ₂ N ⁺ H ₂
	i-Pr	H	OMe	COOCH ₂ CH ₂ OMe	Ms	Me ₃ N ⁺ CH ₂ CH ₂ OH
10	Et	Me	OMe	COOCH ₂ CH ₂ OMe	Ms	i-PrN ⁺ H ₃
	Me	H	Me	CH ₂ OMe	Ms	Na
	Me	H	Me	CH ₂ OMe	Ms	K
	Me	H	Me	CH ₂ OMe	Ms	Ca _{1/2}
	Me	H	Me	CH ₂ OMe	Ms	Mg _{1/2}
15	Me	H	Me	CH ₂ OMe	Ms	EtN ⁺ H ₃
	Me	H	Me	CH ₂ OMe	Ms	i-PrN ⁺ H ₃
	Me	H	Me	CH ₂ OMe	Ms	Et ₂ N ⁺ H ₂
	Me	H	Me	CH ₂ OMe	Ms	Me ₃ N ⁺ CH ₂ CH ₂ OH
20	Et	H	Me	CH ₂ OMe	Ms	Na
	Et	H	Me	CH ₂ OMe	Ms	K
	Et	H	Me	CH ₂ OMe	Ms	Ca _{1/2}
	Et	H	Me	CH ₂ OMe	Ms	Mg _{1/2}
	Et	H	Me	CH ₂ OMe	Ms	EtN ⁺ H ₃
25	Et	H	Me	CH ₂ OMe	Ms	i-PrN ⁺ H ₃
	Et	H	Me	CH ₂ OMe	Ms	Et ₂ N ⁺ H ₂
	Et	H	Me	CH ₂ OMe	Ms	Me ₃ N ⁺ CH ₂ CH ₂ OH
	i-Pr	H	Me	CH ₂ OMe	Ms	Na
30	i-Pr	H	Me	CH ₂ OMe	Ms	K
	i-Pr	H	Me	CH ₂ OMe	Ms	Ca _{1/2}
	i-Pr	H	Me	CH ₂ OMe	Ms	Mg _{1/2}
	i-Pr	H	Me	CH ₂ OMe	Ms	EtN ⁺ H ₃
	i-Pr	H	Me	CH ₂ OMe	Ms	i-PrN ⁺ H ₃
35	i-Pr	H	Me	CH ₂ OMe	Ms	Et ₂ N ⁺ H ₂
	i-Pr	H	Me	CH ₂ OMe	Ms	Me ₃ N ⁺ CH ₂ CH ₂ OH
	Me	Me	Me	CH ₂ OMe	Ms	i-PrN ⁺ H ₃
	Et	Me	Me	CH ₂ OMe	Ms	Na
	Et	Me	Me	CH ₂ OMe	Ms	i-PrN ⁺ H ₃
40	i-Pr	Me	Me	CH ₂ OMe	Ms	i-PrN ⁺ H ₃
	Me	H	Cl	CH ₂ OMe	Ms	Na
	Me	H	Cl	CH ₂ OMe	Ms	K
	Me	H	Cl	CH ₂ OMe	Ms	Ca _{1/2}
	Me	H	Cl	CH ₂ OMe	Ms	Mg _{1/2}
45	Me	H	Cl	CH ₂ OMe	Ms	EtN ⁺ H ₃
	Me	H	Cl	CH ₂ OMe	Ms	i-PrN ⁺ H ₃
	Me	H	Cl	CH ₂ OMe	Ms	Et ₂ N ⁺ H ₂
	Me	H	Cl	CH ₂ OMe	Ms	Me ₃ N ⁺ CH ₂ CH ₂ OH

50

55

	A	B	X	Y	Z	Q
5	Et	H	Cl	CH ₂ OMe	Ms	Na
	Et	H	Cl	CH ₂ OMe	Ms	K
	Et	H	Cl	CH ₂ OMe	Ms	Ca _{1/2}
10	Et	H	Cl	CH ₂ OMe	Ms	Mg _{1/2}
	Et	H	Cl	CH ₂ OMe	Ms	EtN ⁺ H ₃
	Et	H	Cl	CH ₂ OMe	Ms	i-PrN ⁺ H ₃
	Et	H	Cl	CH ₂ OMe	Ms	Et ₂ N ⁺ H ₂
	Et	H	Cl	CH ₂ OMe	Ms	Me ₃ N ⁺ CH ₂ CH ₂ OH
15	i-Pr	H	Cl	CH ₂ OMe	Ms	Na
	i-Pr	H	Cl	CH ₂ OMe	Ms	K
	i-Pr	H	Cl	CH ₂ OMe	Ms	Ca _{1/2}
	i-Pr	H	Cl	CH ₂ OMe	Ms	Mg _{1/2}
20	i-Pr	H	Cl	CH ₂ OMe	Ms	EtN ⁺ H ₃
	i-Pr	H	Cl	CH ₂ OMe	Ms	i-PrN ⁺ H ₃
	i-Pr	H	Cl	CH ₂ OMe	Ms	Et ₂ N ⁺ H ₂
	i-Pr	H	Cl	CH ₂ OMe	Ms	Me ₃ N ⁺ CH ₂ CH ₂ OH
	Me	Me	Cl	CH ₂ OMe	Ms	i-PrN ⁺ H ₃
25	Et	Me	Cl	CH ₂ OMe	Ms	Na
	Et	Me	Cl	CH ₂ OMe	Ms	i-PrN ⁺ H ₃
	i-Pr	Me	Cl	CH ₂ OMe	Ms	i-PrN ⁺ H ₃
	Me	H	OMe	CH ₂ OMe	Ms	Na
	Me	H	OMe	CH ₂ OMe	Ms	K
30	Me	H	OMe	CH ₂ OMe	Ms	Ca _{1/2}
	Me	H	OMe	CH ₂ OMe	Ms	Mg _{1/2}
	Me	H	OMe	CH ₂ OMe	Ms	EtN ⁺ H ₃
	Me	H	OMe	CH ₂ OMe	Ms	i-PrN ⁺ H ₃
	Me	H	OMe	CH ₂ OMe	Ms	Et ₂ N ⁺ H ₂
35	Me	H	OMe	CH ₂ OMe	Ms	Me ₃ N ⁺ CH ₂ CH ₂ OH
	Et	H	OMe	CH ₂ OMe	Ms	Na
	Et	H	OMe	CH ₂ OMe	Ms	K
	Et	H	OMe	CH ₂ OMe	Ms	Ca _{1/2}
40	Et	H	OMe	CH ₂ OMe	Ms	Mg _{1/2}
	Et	H	OMe	CH ₂ OMe	Ms	EtN ⁺ H ₃
	Et	H	OMe	CH ₂ OMe	Ms	i-PrN ⁺ H ₃
	Et	H	OMe	CH ₂ OMe	Ms	Et ₂ N ⁺ H ₂
	Et	H	OMe	CH ₂ OMe	Ms	Me ₃ N ⁺ CH ₂ CH ₂ OH
45	i-Pr	H	OMe	CH ₂ OMe	Ms	Na
	i-Pr	H	OMe	CH ₂ OMe	Ms	K
	i-Pr	H	OMe	CH ₂ OMe	Ms	Ca _{1/2}
	i-Pr	H	OMe	CH ₂ OMe	Ms	Mg _{1/2}

50

55

	A	B	X	Y	Z	Q
5	i-Pr	H	OMe	CH ₂ OMe	Ms	EtN ⁺ H ₃
	i-Pr	H	OMe	CH ₂ OMe	Ms	i-PrN ⁺ H ₃
	i-Pr	H	OMe	CH ₂ OMe	Ms	Et ₂ N ⁺ H ₂
10	i-Pr	H	OMe	CH ₂ OMe	Ms	Me ₃ N ⁺ CH ₂ CH ₂ OH
	Et	Me	OMe	CH ₂ OMe	Ms	i-PrN ⁺ H ₃
	Me	H	Me	CH ₂ OEt	Ms	Na
	Me	H	Me	CH ₂ OEt	Ms	K
	Me	H	Me	CH ₂ OEt	Ms	Ca _{1/2}
15	Me	H	Me	CH ₂ OEt	Ms	Mg _{1/2}
	Me	H	Me	CH ₂ OEt	Ms	EtN ⁺ H ₃
	Me	H	Me	CH ₂ OEt	Ms	i-PrN ⁺ H ₃
	Me	H	Me	CH ₂ OEt	Ms	Et ₂ N ⁺ H ₂
20	Me	H	Me	CH ₂ OEt	Ms	Me ₃ N ⁺ CH ₂ CH ₂ OH
	Et	H	Me	CH ₂ OEt	Ms	Na
	Et	H	Me	CH ₂ OEt	Ms	K
	Et	H	Me	CH ₂ OEt	Ms	Ca _{1/2}
	Et	H	Me	CH ₂ OEt	Ms	Mg _{1/2}
25	Et	H	Me	CH ₂ OEt	Ms	EtN ⁺ H ₃
	Et	H	Me	CH ₂ OEt	Ms	i-PrN ⁺ H ₃
	Et	H	Me	CH ₂ OEt	Ms	Et ₂ N ⁺ H ₂
	Et	H	Me	CH ₂ OEt	Ms	Me ₃ N ⁺ CH ₂ CH ₂ OH
30	i-Pr	H	Me	CH ₂ OEt	Ms	Na
	i-Pr	H	Me	CH ₂ OEt	Ms	K
	i-Pr	H	Me	CH ₂ OEt	Ms	Ca _{1/2}
	i-Pr	H	Me	CH ₂ OEt	Ms	Mg _{1/2}
	i-Pr	H	Me	CH ₂ OEt	Ms	EtN ⁺ H ₃
35	i-Pr	H	Me	CH ₂ OEt	Ms	i-PrN ⁺ H ₃
	i-Pr	H	Me	CH ₂ OEt	Ms	Et ₂ N ⁺ H ₂
	i-Pr	H	Me	CH ₂ OEt	Ms	Me ₃ N ⁺ CH ₂ CH ₂ OH
	Me	Me	Me	CH ₂ OEt	Ms	i-PrN ⁺ H ₃
	Et	Me	Me	CH ₂ OEt	Ms	Na
40	Et	Me	Me	CH ₂ OEt	Ms	i-PrN ⁺ H ₃
	i-Pr	Me	Me	CH ₂ OEt	Ms	i-PrN ⁺ H ₃
	Me	H	Cl	CH ₂ OEt	Ms	Na
	Me	H	Cl	CH ₂ OEt	Ms	K
	Me	H	Cl	CH ₂ OEt	Ms	Ca _{1/2}
45	Me	H	Cl	CH ₂ OEt	Ms	Mg _{1/2}
	Me	H	Cl	CH ₂ OEt	Ms	EtN ⁺ H ₃
	Me	H	Cl	CH ₂ OEt	Ms	i-PrN ⁺ H ₃
	Me	H	Cl	CH ₂ OEt	Ms	Et ₂ N ⁺ H ₂

50

55

	A	B	X	Y	Z	Q
5	Me	H	Cl	CH ₂ OEt	Ms	Me ₃ N ⁺ CH ₂ CH ₂ OH
	Et	H	Cl	CH ₂ OEt	Ms	Na
	Et	H	Cl	CH ₂ OEt	Ms	K
10	Et	H	Cl	CH ₂ OEt	Ms	Ca _{1/2}
	Et	H	Cl	CH ₂ OEt	Ms	Mg _{1/2}
	Et	H	Cl	CH ₂ OEt	Ms	EtN ⁺ H ₃
	Et	H	Cl	CH ₂ OEt	Ms	i-PrN ⁺ H ₃
	Et	H	Cl	CH ₂ OEt	Ms	Et ₂ N ⁺ H ₂
15	Et	H	Cl	CH ₂ OEt	Ms	Me ₃ N ⁺ CH ₂ CH ₂ OH
	i-Pr	H	Cl	CH ₂ OEt	Ms	Na
	i-Pr	H	Cl	CH ₂ OEt	Ms	K
	i-Pr	H	Cl	CH ₂ OEt	Ms	Ca _{1/2}
	i-Pr	H	Cl	CH ₂ OEt	Ms	Mg _{1/2}
20	i-Pr	H	Cl	CH ₂ OEt	Ms	EtN ⁺ H ₃
	i-Pr	H	Cl	CH ₂ OEt	Ms	i-PrN ⁺ H ₃
	i-Pr	H	Cl	CH ₂ OEt	Ms	Et ₂ N ⁺ H ₂
	i-Pr	H	Cl	CH ₂ OEt	Ms	Me ₃ N ⁺ CH ₂ CH ₂ OH
25	Me	Me	Cl	CH ₂ OEt	Ms	i-PrN ⁺ H ₃
	Et	Me	Cl	CH ₂ OEt	Ms	Na
	Et	Me	Cl	CH ₂ OEt	Ms	i-PrN ⁺ H ₃
	i-Pr	Me	Cl	CH ₂ OEt	Ms	i-PrN ⁺ H ₃
	Me	H	OMe	CH ₂ OEt	Ms	Na
30	Me	H	OMe	CH ₂ OEt	Ms	K
	Me	H	OMe	CH ₂ OEt	Ms	Ca _{1/2}
	Me	H	OMe	CH ₂ OEt	Ms	Mg _{1/2}
	Me	H	OMe	CH ₂ OEt	Ms	EtN ⁺ H ₃
	Me	H	OMe	CH ₂ OEt	Ms	i-PrN ⁺ H ₃
35	Me	H	OMe	CH ₂ OEt	Ms	Et ₂ N ⁺ H ₂
	Me	H	OMe	CH ₂ OEt	Ms	Me ₃ N ⁺ CH ₂ CH ₂ OH
	Et	H	OMe	CH ₂ OEt	Ms	Na
	Et	H	OMe	CH ₂ OEt	Ms	K
40	Et	H	OMe	CH ₂ OEt	Ms	Ca _{1/2}
	Et	H	OMe	CH ₂ OEt	Ms	Mg _{1/2}
	Et	H	OMe	CH ₂ OEt	Ms	EtN ⁺ H ₃
	Et	H	OMe	CH ₂ OEt	Ms	i-PrN ⁺ H ₃
	Et	H	OMe	CH ₂ OEt	Ms	Et ₂ N ⁺ H ₂
45	Et	H	OMe	CH ₂ OEt	Ms	Me ₃ N ⁺ CH ₂ CH ₂ OH
	i-Pr	H	OMe	CH ₂ OEt	Ms	Na
	i-Pr	H	OMe	CH ₂ OEt	Ms	K
	i-Pr	H	OMe	CH ₂ OEt	Ms	Ca _{1/2}
50						
55						

	A	B	X	Y	Z	Q
5	i-Pr	H	OMe	CH ₂ OEt	Ms	Mg _{1/2}
	i-Pr	H	OMe	CH ₂ OEt	Ms	EtN ⁺ H ₃
	i-Pr	H	OMe	CH ₂ OEt	Ms	i-PrN ⁺ H ₃
10	i-Pr	H	OMe	CH ₂ OEt	Ms	Et ₂ N ⁺ H ₂
	i-Pr	H	OMe	CH ₂ OEt	Ms	Me ₃ N ⁺ CH ₂ CH ₂ OH
	Et	Me	OMe	CH ₂ OEt	Ms	i-PrN ⁺ H ₃
	Me	H	Me	CHMeOMe	Ms	Na
	Me	H	Me	CHMeOMe	Ms	K
15	Me	H	Me	CHMeOMe	Ms	Ca _{1/2}
	Me	H	Me	CHMeOMe	Ms	Mg _{1/2}
	Me	H	Me	CHMeOMe	Ms	EtN ⁺ H ₃
	Me	H	Me	CHMeOMe	Ms	i-PrN ⁺ H ₃
	Me	H	Me	CHMeOMe	Ms	Et ₂ N ⁺ H ₂
20	Me	H	Me	CHMeOMe	Ms	Me ₃ N ⁺ CH ₂ CH ₂ OH
	Et	H	Me	CHMeOMe	Ms	Na
	Et	H	Me	CHMeOMe	Ms	K
	Et	H	Me	CHMeOMe	Ms	Ca _{1/2}
25	Et	H	Me	CHMeOMe	Ms	Mg _{1/2}
	Et	H	Me	CHMeOMe	Ms	EtN ⁺ H ₃
	Et	H	Me	CHMeOMe	Ms	i-PrN ⁺ H ₃
	Et	H	Me	CHMeOMe	Ms	Et ₂ N ⁺ H ₂
	Et	H	Me	CHMeOMe	Ms	Me ₃ N ⁺ CH ₂ CH ₂ OH
30	i-Pr	H	Me	CHMeOMe	Ms	Na
	i-Pr	H	Me	CHMeOMe	Ms	K
	i-Pr	H	Me	CHMeOMe	Ms	Ca _{1/2}
	i-Pr	H	Me	CHMeOMe	Ms	Mg _{1/2}
35	i-Pr	H	Me	CHMeOMe	Ms	EtN ⁺ H ₃
	i-Pr	H	Me	CHMeOMe	Ms	i-PrN ⁺ H ₃
	i-Pr	H	Me	CHMeOMe	Ms	Et ₂ N ⁺ H ₂
	i-Pr	H	Me	CHMeOMe	Ms	Me ₃ N ⁺ CH ₂ CH ₂ OH
	Me	Me	Me	CHMeOMe	Ms	i-PrN ⁺ H ₃
40	Et	Me	Me	CHMeOMe	Ms	Na
	Et	Me	Me	CHMeOMe	Ms	i-PrN ⁺ H ₃
	i-Pr	Me	Me	CHMeOMe	Ms	i-PrN ⁺ H ₃
	Me	H	Cl	CHMeOMe	Ms	Na
	Me	H	Cl	CHMeOMe	Ms	K
45	Me	H	Cl	CHMeOMe	Ms	Ca _{1/2}
	Me	H	Cl	CHMeOMe	Ms	Mg _{1/2}
	Me	H	Cl	CHMeOMe	Ms	EtN ⁺ H ₃
	Me	H	Cl	CHMeOMe	Ms	i-PrN ⁺ H ₃

50

55

	A	B	X	Y	Z	G
5	Me	H	Cl	CHMeOMe	Ms	Et ₂ N ⁺ H ₂
	Me	H	Cl	CHMeOMe	Ms	Me ₃ N ⁺ CH ₂ CH ₂ OH
	Et	H	Cl	CHMeOMe	Ms	Na
	Et	H	Cl	CHMeOMe	Ms	K
10	Et	H	Cl	CHMeOMe	Ms	Ca _{1/2}
	Et	H	Cl	CHMeOMe	Ms	Mg _{1/2}
	Et	H	Cl	CHMeOMe	Ms	EtN ⁺ H ₃
	Et	H	Cl	CHMeOMe	Ms	i-PrN ⁺ H ₃
15	Et	H	Cl	CHMeOMe	Ms	Et ₂ N ⁺ H ₂
	Et	H	Cl	CHMeOMe	Ms	Me ₃ N ⁺ CH ₂ CH ₂ OH
	i-Pr	H	Cl	CHMeOMe	Ms	Na
	i-Pr	H	Cl	CHMeOMe	Ms	K
	i-Pr	H	Cl	CHMeOMe	Ms	Ca _{1/2}
20	i-Pr	H	Cl	CHMeOMe	Ms	Mg _{1/2}
	i-Pr	H	Cl	CHMeOMe	Ms	EtN ⁺ H ₃
	i-Pr	H	Cl	CHMeOMe	Ms	i-PrN ⁺ H ₃
	i-Pr	H	Cl	CHMeOMe	Ms	Et ₂ N ⁺ H ₂
25	i-Pr	H	Cl	CHMeOMe	Ms	Me ₃ N ⁺ CH ₂ CH ₂ OH
	Me	Me	Cl	CHMeOMe	Ms	i-PrN ⁺ H ₃
	Et	Me	Cl	CHMeOMe	Ms	Na
	Et	Me	Cl	CHMeOMe	Ms	i-PrN ⁺ H ₃
	i-Pr	Me	Cl	CHMeOMe	Ms	i-PrN ⁺ H ₃
30	Me	H	OMe	CHMeOMe	Ms	Na
	Me	H	OMe	CHMeOMe	Ms	K
	Me	H	OMe	CHMeOMe	Ms	Ca _{1/2}
	Me	H	OMe	CHMeOMe	Ms	Mg _{1/2}
35	Me	H	OMe	CHMeOMe	Ms	EtN ⁺ H ₃
	Me	H	OMe	CHMeOMe	Ms	i-PrN ⁺ H ₃
	Me	H	OMe	CHMeOMe	Ms	Et ₂ N ⁺ H ₂
	Me	H	OMe	CHMeOMe	Ms	Me ₃ N ⁺ CH ₂ CH ₂ OH
	Et	H	OMe	CHMeOMe	Ms	Na
40	Et	H	OMe	CHMeOMe	Ms	K
	Et	H	OMe	CHMeOMe	Ms	Ca _{1/2}
	Et	H	OMe	CHMeOMe	Ms	Mg _{1/2}
	Et	H	OMe	CHMeOMe	Ms	EtN ⁺ H ₃
	Et	H	OMe	CHMeOMe	Ms	i-PrN ⁺ H ₃
45	Et	H	OMe	CHMeOMe	Ms	Et ₂ N ⁺ H ₂
	Et	H	OMe	CHMeOMe	Ms	Me ₃ N ⁺ CH ₂ CH ₂ OH
	i-Pr	H	OMe	CHMeOMe	Ms	Na
	i-Pr	H	OMe	CHMeOMe	Ms	K

50

55

	A	B	X	Y	Z	Q
5	i-Pr	H	OMe	CHMeOMe	Ms	Ca _{1/2}
	i-Pr	H	OMe	CHMeOMe	Ms	Mg _{1/2}
	i-Pr	H	OMe	CHMeOMe	Ms	EtN ⁺ H ₃
10	i-Pr	H	OMe	CHMeOMe	Ms	i-PrN ⁺ H ₃
	i-Pr	H	OMe	CHMeOMe	Ms	Et ₂ N ⁺ H ₂
	i-Pr	H	OMe	CHMeOMe	Ms	Me ₃ N ⁺ CH ₂ CH ₂ OH
	Et	Me	OMe	CHMeOMe	Ms	i-PrN ⁺ H ₃
	Me	H	Me	CHMeOEt	Ms	Na
15	Me	H	Me	CHMeOEt	Ms	K
	Me	H	Me	CHMeOEt	Ms	Ca _{1/2}
	Me	H	Me	CHMeOEt	Ms	Mg _{1/2}
	Me	H	Me	CHMeOEt	Ms	EtN ⁺ H ₃
20	Me	H	Me	CHMeOEt	Ms	i-PrN ⁺ H ₃
	Me	H	Me	CHMeOEt	Ms	Et ₂ N ⁺ H ₂
	Me	H	Me	CHMeOEt	Ms	Me ₃ N ⁺ CH ₂ CH ₂ OH
	Et	H	Me	CHMeOEt	Ms	Na
	Et	H	Me	CHMeOEt	Ms	K
25	Et	H	Me	CHMeOEt	Ms	Ca _{1/2}
	Et	H	Me	CHMeOEt	Ms	Mg _{1/2}
	Et	H	Me	CHMeOEt	Ms	EtN ⁺ H ₃
	Et	H	Me	CHMeOEt	Ms	i-PrN ⁺ H ₃
	Et	H	Me	CHMeOEt	Ms	Et ₂ N ⁺ H ₂
30	Et	H	Me	CHMeOEt	Ms	Me ₃ N ⁺ CH ₂ CH ₂ OH
	i-Pr	H	Me	CHMeOEt	Ms	Na
	i-Pr	H	Me	CHMeOEt	Ms	K
	i-Pr	H	Me	CHMeOEt	Ms	Ca _{1/2}
35	i-Pr	H	Me	CHMeOEt	Ms	Mg _{1/2}
	i-Pr	H	Me	CHMeOEt	Ms	EtN ⁺ H ₃
	i-Pr	H	Me	CHMeOEt	Ms	i-PrN ⁺ H ₃
	i-Pr	H	Me	CHMeOEt	Ms	Et ₂ N ⁺ H ₂
	i-Pr	H	Me	CHMeOEt	Ms	Me ₃ N ⁺ CH ₂ CH ₂ OH
40	Me	Me	Me	CHMeOEt	Ms	i-PrN ⁺ H ₃
	Et	Me	Me	CHMeOEt	Ms	Na
	Et	Me	Me	CHMeOEt	Ms	i-PrN ⁺ H ₃
	i-Pr	Me	Me	CHMeOEt	Ms	i-PrN ⁺ H ₃
	Me	H	Cl	CHMeOEt	Ms	Na
45	Me	H	Cl	CHMeOEt	Ms	K
	Me	H	Cl	CHMeOEt	Ms	Ca _{1/2}
	Me	H	Cl	CHMeOEt	Ms	Mg _{1/2}
	Me	H	Cl	CHMeOEt	Ms	EtN ⁺ H ₃

50

55

	A	B	X	Y	Z	Q
5	Me	H	Cl	CHMeOEt	Ms	i-PrN ⁺ H ₃
	Me	H	Cl	CHMeOEt	Ms	Et ₂ N ⁺ H ₂
	Me	H	Cl	CHMeOEt	Ms	Me ₃ N ⁺ CH ₂ CH ₂ OH
	Et	H	Cl	CHMeOEt	Ms	Na
10	Et	H	Cl	CHMeOEt	Ms	K
	Et	H	Cl	CHMeOEt	Ms	Ca _{1/2}
	Et	H	Cl	CHMeOEt	Ms	Mg _{1/2}
	Et	H	Cl	CHMeOEt	Ms	EtN ⁺ H ₃
15	Et	H	Cl	CHMeOEt	Ms	i-PrN ⁺ H ₃
	Et	H	Cl	CHMeOEt	Ms	Et ₂ N ⁺ H ₂
	Et	H	Cl	CHMeOEt	Ms	Me ₃ N ⁺ CH ₂ CH ₂ OH
	i-Pr	H	Cl	CHMeOEt	Ms	Na
	i-Pr	H	Cl	CHMeOEt	Ms	K
20	i-Pr	H	Cl	CHMeOEt	Ms	Ca _{1/2}
	i-Pr	H	Cl	CHMeOEt	Ms	Mg _{1/2}
	i-Pr	H	Cl	CHMeOEt	Ms	EtN ⁺ H ₃
	i-Pr	H	Cl	CHMeOEt	Ms	i-PrN ⁺ H ₃
	i-Pr	H	Cl	CHMeOEt	Ms	Et ₂ N ⁺ H ₂
25	i-Pr	H	Cl	CHMeOEt	Ms	Me ₃ N ⁺ CH ₂ CH ₂ OH
	Me	Me	Cl	CHMeOEt	Ms	i-PrN ⁺ H ₃
	Et	Me	Cl	CHMeOEt	Ms	Na
	Et	Me	Cl	CHMeOEt	Ms	i-PrN ⁺ H ₃
30	i-Pr	Me	Cl	CHMeOEt	Ms	i-PrN ⁺ H ₃
	Me	H	OMe	CHMeOEt	Ms	Na
	Me	H	OMe	CHMeOEt	Ms	K
	Me	H	OMe	CHMeOEt	Ms	Ca _{1/2}
	Me	H	OMe	CHMeOEt	Ms	Mg _{1/2}
35	Me	H	OMe	CHMeOEt	Ms	EtN ⁺ H ₃
	Me	H	OMe	CHMeOEt	Ms	i-PrN ⁺ H ₃
	Me	H	OMe	CHMeOEt	Ms	Et ₂ N ⁺ H ₂
	Me	H	OMe	CHMeOEt	Ms	Me ₃ N ⁺ CH ₂ CH ₂ OH
40	Et	H	OMe	CHMeOEt	Ms	Na
	Et	H	OMe	CHMeOEt	Ms	K
	Et	H	OMe	CHMeOEt	Ms	Ca _{1/2}
	Et	H	OMe	CHMeOEt	Ms	Mg _{1/2}
	Et	H	OMe	CHMeOEt	Ms	EtN ⁺ H ₃
45	Et	H	OMe	CHMeOEt	Ms	i-PrN ⁺ H ₃
	Et	H	OMe	CHMeOEt	Ms	Et ₂ N ⁺ H ₂
	Et	H	OMe	CHMeOEt	Ms	Me ₃ N ⁺ CH ₂ CH ₂ OH
	i-Pr	H	OMe	CHMeOEt	Ms	Na

50

55

	A	B	X	Y	Z	Q
5	i-Pr	H	OMe	CHMeOEt	Ms	K
	i-Pr	H	OMe	CHMeOEt	Ms	Ca _{1/2}
	i-Pr	H	OMe	CHMeOEt	Ms	Mg _{1/2}
10	i-Pr	H	OMe	CHMeOEt	Ms	EtN ⁺ H ₃
	i-Pr	H	OMe	CHMeOEt	Ms	i-PrN ⁺ H ₃
	i-Pr	H	OMe	CHMeOEt	Ms	Et ₂ N ⁺ H ₂
	i-Pr	H	OMe	CHMeOEt	Ms	Me ₃ N ⁺ CH ₂ CH ₂ OH
	Et	Me	OMe	CHMeOEt	Ms	i-PrN ⁺ H ₃
15	Me	H	Me	CH ₂ CO ₂ Me	Ms	H
	Et	H	Me	CH ₂ CO ₂ Me	Ms	H
	i-Pr	H	Me	CH ₂ CO ₂ Me	Ms	H
	Me	H	Me	CH ₂ CO ₂ Et	Ms	H
	Et	H	Me	CH ₂ CO ₂ Et	Ms	H
20	i-Pr	H	Me	CH ₂ CO ₂ Et	Ms	H
	Me	H	Me	CH ₂ CO ₂ Pr-i	Ms	H
	Et	H	Me	CH ₂ CO ₂ Pr-i	Ms	H
	i-Pr	H	Me	CH ₂ CO ₂ Pr-i	Ms	H
25	Me	H	Me	CHMeCO ₂ Me	Ms	H
	Et	H	Me	CHMeCO ₂ Me	Ms	H
	i-Pr	H	Me	CHMeCO ₂ Me	Ms	H
	Me	H	Me	CHMeCO ₂ Et	Ms	H
	Et	H	Me	CHMeCO ₂ Et	Ms	H
30	i-Pr	H	Me	CHMeCO ₂ Et	Ms	H
	Me	H	Me	CHMeCO ₂ Pr-i	Ms	H
	Et	H	Me	CHMeCO ₂ Pr-i	Ms	H
	i-Pr	H	Me	CHMeCO ₂ Pr-i	Ms	H
	Me	H	Me	CH ₂ CH ₂ CO ₂ Me	Ms	H
35	Et	H	Me	CH ₂ CH ₂ CO ₂ Me	Ms	H
	i-Pr	H	Me	CH ₂ CH ₂ CO ₂ Me	Ms	H
	Me	H	Me	CH ₂ CH ₂ CO ₂ Et	Ms	H
	Et	H	Me	CH ₂ CH ₂ CO ₂ Et	Ms	H
40	i-Pr	H	Me	CH ₂ CH ₂ CO ₂ Et	Ms	H
	Me	H	Me	CH ₂ CH ₂ CO ₂ Pr-i	Ms	H
	Et	H	Me	CH ₂ CH ₂ CO ₂ Pr-i	Ms	H
	i-Pr	H	Me	CH ₂ CH ₂ CO ₂ Pr-i	Ms	H
	Me	H	Me	CH=CHOMe	Ms	H
45	Et	H	Me	CH=CHOMe	Ms	H
	i-Pr	H	Me	CH=CHOMe	Ms	H
	Me	H	Me	CH=CHOEt	Ms	H
	Et	H	Me	CH=CHOEt	Ms	H

50

55

	A	B	X	Y	Z	Q
5	i-Pr	H	Me	CH=CHOEt	Ms	H
	Me	H	Me	CH=CHOPr-i	Ms	H
	Et	H	Me	CH=CHOPr-i	Ms	H
10	i-Pr	H	Me	CH=CHOPr-i	Ms	H
	Me	H	Cl	CH ₂ CO ₂ Me	Ms	H
	Et	H	Cl	CH ₂ CO ₂ Me	Ms	H
	i-Pr	H	Cl	CH ₂ CO ₂ Me	Ms	H
	Me	H	Cl	CH ₂ CO ₂ Et	Ms	H
15	Et	H	Cl	CH ₂ CO ₂ Et	Ms	H
	i-Pr	H	Cl	CH ₂ CO ₂ Et	Ms	H
	Me	H	Cl	CH ₂ CO ₂ Pr-i	Ms	H
	Et	H	Cl	CH ₂ CO ₂ Pr-i	Ms	H
20	i-Pr	H	Cl	CH ₂ CO ₂ Pr-i	Ms	H
	Me	H	Cl	CHMeCO ₂ Me	Ms	H
	Et	H	Cl	CHMeCO ₂ Me	Ms	H
	i-Pr	H	Cl	CHMeCO ₂ Me	Ms	H
	Me	H	Cl	CHMeCO ₂ Et	Ms	H
25	Et	H	Cl	CHMeCO ₂ Et	Ms	H
	i-Pr	H	Cl	CHMeCO ₂ Et	Ms	H
	Me	H	Cl	CHMeCO ₂ Pr-i	Ms	H
	Et	H	Cl	CHMeCO ₂ Pr-i	Ms	H
30	i-Pr	H	Cl	CHMeCO ₂ Pr-i	Ms	H
	Me	H	Cl	CH ₂ CH ₂ CO ₂ Me	Ms	H
	Et	H	Cl	CH ₂ CH ₂ CO ₂ Me	Ms	H
	i-Pr	H	Cl	CH ₂ CH ₂ CO ₂ Me	Ms	H
	Me	H	Cl	CH ₂ CH ₂ CO ₂ Et	Ms	H
35	Et	H	Cl	CH ₂ CH ₂ CO ₂ Et	Ms	H
	i-Pr	H	Cl	CH ₂ CH ₂ CO ₂ Et	Ms	H
	Me	H	Cl	CH ₂ CH ₂ CO ₂ Pr-i	Ms	H
	Et	H	Cl	CH ₂ CH ₂ CO ₂ Pr-i	Ms	H
40	i-Pr	H	Cl	CH ₂ CH ₂ CO ₂ Pr-i	Ms	H
	Me	H	Cl	CH=CHOMe	Ms	H
	Et	H	Cl	CH=CHOMe	Ms	H
	i-Pr	H	Cl	CH=CHOMe	Ms	H
	Me	H	Cl	CH=CHOEt	Ms	H
45	Et	H	Cl	CH=CHOEt	Ms	H
	i-Pr	H	Cl	CH=CHOEt	Ms	H
	Me	H	Cl	CH=CHOPr-i	Ms	H
	Et	H	Cl	CH=CHOPr-i	Ms	H
50	i-Pr	H	Cl	CH=CHOPr-i	Ms	H

When the compound of the present invention is to be used as an agricultural or horticultural herbicide, it is usually mixed with a suitable carrier, for instance, a solid carrier such as clay, talc, bentonite or diatomaceous earth, or a liquid carrier such as water, an alcohol (such as methanol or ethanol), an aromatic hydrocarbon (such as benzene, toluene or xylene), a chlorinated hydrocarbon, an ether, a ketone, an ester (such as ethyl acetate) or an acid amide (such as dimethylformamide). If desired, an emulsifier, a dispersing agent, a suspending agent, a penetrating agent, a spreader or a stabilizer may be added to prepare an optional formulation such as a liquid formulation, an emulsifiable concentrate, a wettable powder, a dust, a

granule or a flowable.

Further, if desired, other herbicides, various insecticides, bacteriocides, plant regulating agents or synergism agents may be combined at the time of the preparation of the formulations or at a time of the application of the herbicides.

As other herbicides to be combined with the herbicide of the present invention, there may be mentioned, for instance, compounds disclosed in Farm Chemicals Handbook, the 73rd Edition (1987). Among them, there may be mentioned, for example, atrazine, cyanazine, alachlor, metolachlor, EPTC, 2,4-D, butylate, dicamba, bromoxynil and tridiphane. Further, N-[(4,6-dimethoxypyrimidin-2-yl)-aminocarbonyl]-3-chloro-4-methoxycarbonyl-1-methylpyrazole-5-sulfonamide or N-[(4,6-dimethoxypyrimidin-2-yl)-aminocarbonyl]-3-bromo-4-methoxycarbonyl-1-methylpyrazole-5-sulfonamide as disclosed in U.S. Patent 4,668,277 may also be combined with the herbicide of the present invention.

The dose varies depending upon the application site, the season for application, the method for application, the type of the crop plant, etc. In general, however, the dose is usually within a range of from 0.001 to 10 kg per hectare as the amount of the active ingredient.

Now, Formulation Examples of the herbicides containing the compounds of the present invention as active ingredients, will be given. However, it should be understood that the present invention is by no means restricted to such specific Examples. In the following Formulation Examples, "parts" means "parts by weight".

FORMULATION EXAMPLE 1: Wettable powder Compound No. 3 of the present invention 60 parts
Zeeklite PFP (tradename for a kaolin-type clay, manufactured by Zeeklite Industries, Co., Ltd.) 33 parts
Sorpul 5039 (tradename for a mixture of a nonionic surfactant and an anionic surfactant, manufactured by Toho Chemical Co., Ltd.) 5 parts
Carplex (tradename for a coagulation-preventing agent composed of a mixture of a surfactant and fine silica powder, manufactured by Shionogi Pharmaceutical Co., Ltd.) 2 parts

The above ingredients are homogeneously pulverized and mixed to form a wettable powder.

FORMULATION EXAMPLE 2: Wettable powder Compound No. 7 of the present invention 60 parts
Zeeklite PFP (tradename for a kaolin-type clay, manufactured by Zeeklite Industries, Co., Ltd.) 33 parts
Sorpul 5039 (tradename for a mixture of a nonionic surfactant and an anionic surfactant, manufactured by Toho Chemical Co., Ltd.) 5 parts
Carplex (tradename for a coagulation-preventing agent composed of a mixture of a surfactant and fine silica powder, manufactured by Shionogi Pharmaceutical Co., Ltd.) 2 parts

FORMULATION EXAMPLE 3: Wettable powder Compound No. 15 of the present invention 60 parts
Zeeklite PFP (tradename for a kaolin-type clay, manufactured by Zeeklite Industries, Co., Ltd.) 33 parts
Sorpul 5039 (tradename for a mixture of a nonionic surfactant and an anionic surfactant, manufactured by Toho Chemical Co., Ltd.) 5 parts
Carplex (tradename for a coagulation-preventing agent composed of a mixture of a surfactant and fine silica powder, manufactured by Shionogi Pharmaceutical Co., Ltd.) 2 parts

FORMULATION EXAMPLE 4: Wettable powder Compound No. 21 of the present invention 60 parts
Zeeklite PFP (tradename for a kaolin-type clay, manufactured by Zeeklite Industries, Co., Ltd.) 33 parts
Sorpul 5039 (tradename for a mixture of a nonionic surfactant and an anionic surfactant, manufactured by Toho Chemical Co., Ltd.) 5 parts
Carplex (tradename for a coagulation-preventing agent composed of a mixture of a surfactant and fine silica powder, manufactured by Shionogi Pharmaceutical Co., Ltd.) 2 parts

FORMULATION EXAMPLE 5: Wettable powder Compound No. 25 of the present invention 60 parts
 Zeeklite PFP (tradename for a kaolin-type clay, manufactured by Zeeklite Industries, Co., Ltd.) 33 parts
 Sorpol 5039 (tradename for a mixture of a nonionic surfactant and an anionic surfactant, manufactured by Toho Chemical Co., Ltd.) 5 parts

- 5 Carplex (tradename for a coagulation-preventing agent composed of a mixture of a surfactant and fine silica powder, manufactured by Shionogi Pharmaceutical Co., Ltd.) 2 parts

FORMULATION EXAMPLE 6: Wettable powder Compound No. 35 of the present invention 60 parts
 10 Zeeklite PFP (tradename for a kaolin-type clay, manufactured by Zeeklite Industries, Co., Ltd.) 33 parts
 Sorpol 5039 (tradename for a mixture of a nonionic surfactant and an anionic surfactant, manufactured by Toho Chemical Co., Ltd.) 5 parts
 Carplex (tradename for a coagulation-preventing agent composed of a mixture of a surfactant and fine silica powder, manufactured by Shionogi Pharmaceutical Co., Ltd.) 2 parts

15

FORMULATION EXAMPLE 7: Emulsifiable concentrate Compound No. 3 of the present invention 1.5 parts

Xylene 78.5 parts

- 20 N,N-dimethylformamide 15 parts

Sorpol 2680 (tradename for a mixture of a nonionic surfactant and an anionic surfactant, manufactured by Toho Chemical Co., Ltd.) 5 parts

- 25 The above ingredients are homogeneously mixed to obtain an emulsifiable concentrate.

FORMULATION EXAMPLE 8: Emulsifiable concentrate Compound No. 11 of the present invention 1.5 parts

- 30 Xylene 78.5 parts

N,N-dimethylformamide 15 parts

Sorpol 2680 (tradename for a mixture of a nonionic surfactant and an anionic surfactant, manufactured by Toho Chemical Co., Ltd.) 5 parts

35

FORMULATION EXAMPLE 9: Flowable Compound No. 3 of the present invention 40 parts

Agrizole B-710 (tradename for a nonionic surfactant, manufactured by Kao Corporation) 10 parts

Runox 1000C (tradename for an anionic surfactant, manufactured by Toho Chemical Co., Ltd.) 0.5 part

1% Rodopol water (tradename for a thickener, manufactured by Rhone-Poulenc) 20 parts

- 40 Water 29.5 parts

The above ingredients are homogeneously mixed to form a flowable.

45

FORMULATION EXAMPLE 10: Flowable Compound No. 10 of the present invention 40 parts

Agrizole B-710 (tradename for a nonionic surfactant, manufactured by Kao Corporation) 10 parts

Runox 1000C (tradename for an anionic surfactant, manufactured by Toho Chemical Co., Ltd.) 0.5 part

1% Rodopol water (tradename for a thickener, manufactured by Rhone-Poulenc) 20 parts

- 50 Water 29.5 parts

FORMULATION EXAMPLE 11: Liquid formulation Compound No. 39 of the present invention 30 parts

Nippol (tradename for a nonionic surfactant, manufactured by Nissan Chemical Industries, Ltd.) 10 parts

- 55 Water 60 parts

The above ingredients are homogeneously mixed to obtain a liquid formulation.

FORMULATION EXAMPLE 12: Liquid formulation Compound No. 40 of the present invention 30 parts
 Nippol (tradename for a nonionic surfactant, manufactured by Nissan Chemical Industries, Ltd.) 10 parts
 Water 60 parts

FORMULATION EXAMPLE 13: Liquid formulation Compound No. 46 of the present invention 30 parts
 Nippol (tradename for a nonionic surfactant, manufactured by Nissan Chemical Industries, Ltd.) 10 parts
 Water 60 parts

FORMULATION EXAMPLE 14: Liquid formulation Compound No. 41 of the present invention 10 parts
 Sorpol W-150 (tradename for a nonionic surfactant, manufactured by Toho Chemical Co., Ltd.) 10 parts
 Water 80 parts

The above ingredients are homogeneously mixed to form a liquid formulation.

In their use, the above wettable powders, emulsifiable concentrates, flowables or liquid formulations are diluted with water from 50 to 1,000 times and applied so that the respective active ingredients will be from 0.001 to 5 kg per hectare.

The compounds of the present invention are applicable not only to agricultural and horticultural fields such as upland fields, paddy fields and orchards, but to non-agricultural fields such as athletic fields, vacant fields and railway sides for the control of various weeds. The dose in their application varies depending upon the application site, the season for application, the type of crop plants, etc. However, it is usually within a range of from 0.001 to 5 kg per hectare.

Now, the herbicidal activities of the compounds of the present invention will be described with respect to specific Test Examples.

TEST EXAMPLE 1: Test on the herbicidal effects in soil treatment

A plastic box having a length of 15 cm, a width of 22 cm and a depth of 6 cm was filled with a sterilized diluvium soil, and seeds Echinochloa crus-galli, Setaria viridis, Eleusine indica, Digitaria adscendens, Panicum dichotomiflorum, Abutilon theophrasti, Amaranthus lividus, Polygonum longisetum and Zea mays were sown, and tubers of Cyperus esculentus were further planted. The soil was covered thereon in the thickness of about 1.5 cm, and then a herbicide solution was applied onto the surface of the soil uniformly so that the active ingredient is distributed at a predetermined concentration. The herbicide solution was prepared by diluting a wettable powder, an emulsifiable concentrate, a liquid formulation or a flowable with water and applied onto the entire soil surface by means of a small spray. Three weeks after the application of the herbicidal solution, the herbicidal effects against each weed were determined on the basis of the following standard ratings. The results thereby obtained are shown in Table 6. The Compound Nos. correspond to the Compound Nos. in Table 3.

Standard ratings: 5: Growth control rate of more than 90% (almost completely withered)

4: Growth control rate of from 70 to 90%

3: Growth control rate of from 40 to 70%

2: Growth control rate of from 20 to 40%

1: Growth control rate of from 5 to 20%

0: Growth control rate of less than 5% (almost non-effective)

The above growth control rates were calculated by the following equation:

$$\text{Growth control rate (\%)} = \left(1 - \frac{T}{N}\right) \times 100$$

where

T: Weight of the weed growth above the soil surface of the treated area

N: Weight of the weed grown above the soil surface of the non-treated area

TEST EXAMPLE 2: Test on the herbicidal effects in foliage treatment

A plastic box having a length of 15 cm, a width of 22 cm and a depth of 6 cm was filled with a sterilized diluvium soil, and seeds of Echinochloa crus-galli, Setaria viridis, Eleusine indica, Digitaria adscendens,
 5 Panicum dichotomiflorum, Xanthium strumarium, Abutilon theophrasti, Amaranthus lividus, Polygonum longisetum and Zea mays were spot-wisely sown, and tubers of Cyperus esculentus were further planted. Then, the soil was covered thereon in a thickness of about 1.5 cm. When the various weeds and crops grew to the 2 or 3 leaf stage, a herbicidal solution was uniformly sprayed on the foliages so that the active ingredient is applied in a predetermined concentration.

10 The herbicidal solution was prepared by diluting the wettable powder, the emulsifiable concentrate, the liquid formulation or the flowable as described in the above Formulation Examples with water and applied onto the entire surface of the foliages of the weeds and the crop plants by a small spray. Two weeks after the application of the herbicide solution, the herbicidal effects against each weed were determined on the basis of the standard ratings described in Test Example 1, and the phytotoxicity against each crop plant
 15 was determined on the basis of the standard ratings in Test Example 1. The results are shown in Table 7. The Compound Nos. in Table 7 correspond to the Compound Nos. in Table 3.

In Tables 6 and 7, the following abbreviations are used:

Dose: Dose of active ingredient (g/are)

EC: Echinochloa crus-galli (barnyardgrass)

20 SE: Setaria viridis (green foxtail)

EL: Eleusine indica (goosegrass)

DI: Digitaria adscendens (large crabgrass)

PA: Panicum dichotomiflorum (fall panicum)

AB: Abutilon theophrasti (velvet leaf)

25 AM: Amaranthus lividus (livid amaranth)

PO: Polygonum longisetum (persicaria blumei gross)

XA: Xanthium strumarium (cocklebur)

CY: Cyperus esculentus (yellow nutsedge)

ZE: Zea mays (corn)

30

35

40

45

50

55

Table 6

Compound No.	Dose	EC	SE	EL	DI	PA	AB	AM	PO	CY	ZE
1	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
2	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
3	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
4	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
6	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
7	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
8	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0

Table 6 (continued)

Compound No.	Dose	EC	SE	EL	DI	PA	AB	AM	PO	CY	ZE
9	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
10	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
11	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
12	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
13	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
14	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
15	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0

Table 6 (continued)

Compound No.	Dose	EC	SE	EL	DI	PA	AB	AM	PO	CY	ZE
16	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
17	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
18	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
19	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
20	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
21	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
22	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0

Table 6 (continued)

Compound No.	Dose	EC	SE	EL	DI	PA	AB	AM	PO	CY	ZE
23	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
24	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
25	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
26	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
27	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
28	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
29	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0

Table 6 (continued)

Compound No.	Dose	EC	SE	EL	DI	PA	AB	AM	PO	CY	ZE
30	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
34	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
35	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
36	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
37	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
39	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
40	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0

Table 6 (continued)

5												
10	Compound No.	Dose	EC	SE	EL	DI	PA	AB	AM	PO	CY	ZE
15	41	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
20	42	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
25	43	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
30	44	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
35	45	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
40	46	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
45	47	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0

50

55

Table 6 (continued)

5												
10	Compound No.	Dose	EC	SE	EL	DI	PA	AB	AM	PO	CY	ZE
15	48	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
20	49	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
25	50	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
30	56	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
35	58	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
40	61	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
45	63	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
50												
55												

Table 6 (continued)

5												
10	Compound No.	Dose	EC	SE	EL	DI	PA	AB	AM	PO	CY	ZE
15	64	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
20	65	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
25	66	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
30	67	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
35	68	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
40	Reference Example A	4 8 16	3 4 5	1 2 3	3 4 5	3 4 5	1 2 3	4 5 5	5 5 5	5 5 5	0 0 1	0 0 1
45	Reference Example B	4 8 16	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	1 2 3	1 2 3	1 2 3	2 3 4	0 0 1
50												
55												

Table 7

5

10

15

20

25

30

35

40

45

Compound No.	Dose	EC	SE	EL	DI	PA	AB	AM	PO	XA	CY	ZE
1	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
2	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
3	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
4	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
6	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
7	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
8	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0

50

55

Table 7 (continued)

5													
10	Compound No.	Dose	EC	SE	EL	DI	PA	AB	AM	PO	XA	CY	ZE
15	9	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
20	10	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
25	11	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
30	12	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
35	13	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
40	14	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
45	15	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0

50

55

Table 7 (continued)

Compound No.	Dose	EC	SE	EL	DI	PA	AB	AM	PO	XA	CY	ZE
16	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
17	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
18	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
19	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
20	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
21	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
22	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0

Table 7 (continued)

5

10

15

20

25

30

35

40

45

Compound No.	Dose	EC	SE	EL	DI	PA	AB	AM	PO	XA	CY	ZE
23	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
24	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
25	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
26	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
27	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
28	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
29	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0

50

55

Table 7 (continued)

Compound No.	Dose	EC	SE	EL	DI	PA	AB	AM	PO	XA	CY	ZE
30	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
34	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
35	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
36	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
37	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
39	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
40	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0

Table 7 (continued)

Compound No.	Dose	EC	SE	EL	DI	PA	AB	AM	PO	XA	CY	ZE
41	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
42	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
43	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
44	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
45	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
46	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
47	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0

Table 7 (continued)

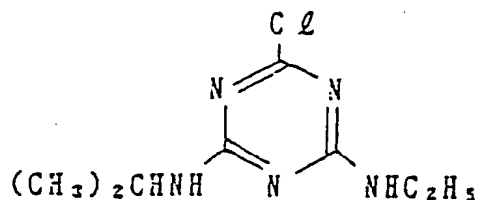
Compound No.	Dose	EC	SE	EL	DI	PA	AB	AM	PO	XA	CY	ZE
48	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
49	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
50	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
56	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
58	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
61	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
63	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0

Table 7 (continued)

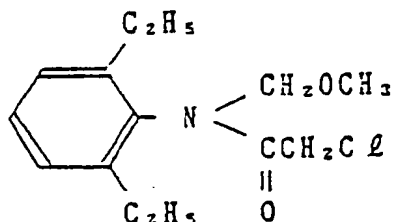
Compound No.	Dose	EC	SE	EL	DI	PA	AB	AM	PO	XA	CY	ZE
64	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
65	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
66	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
67	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
68	0.5 1 2	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	0 0 0
Reference Example A	4 8 16	3 4 5	1 2 3	2 3 4	3 4 5	0 1 2	3 5 5	5 5 5	5 5 5	4 5 5	0 0 1	0 1 2
Reference Example B	4 8 16	4 4 5	3 4 5	3 4 5	4 4 5	3 4 5	0 1 2	2 3 4	2 3 4	0 1 2	1 2 3	0 1 2

In Tables 6 and 7, the Comparative Compounds are as follows:

Comparative Compound A: Atrazine

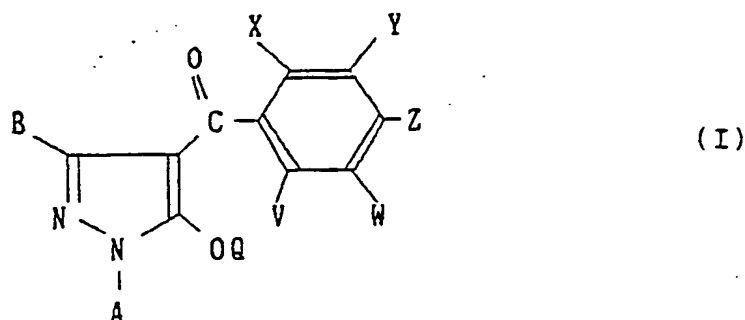


Comparative Compound B: Alachlor



Claims

1. A pyrazole derivative having the formula:



wherein A is an alkyl group having from 1 to 3 carbon atoms, an alkenyl group having from 2 to 4 carbon atoms or an alkynyl group having from 2 to 4 carbon atoms; B is a hydrogen atom, an alkyl group having from 1 to 3 carbon atoms, a halogen atom, a haloalkyl group having from 1 to 3 carbon atoms, an alkoxy group having from 1 to 3 carbon atoms, an alkylthio group having from 1 to 3 carbon atoms, an alkoxyalkyl group having from 2 to 4 carbon atoms, an alkylthioalkyl group having from 2 to 4 carbon atoms or an alkoxyalkyl group having from 2 to 4 carbon atoms; X is an alkyl group having from 1 to 6 carbon atoms, a haloalkyl group having from 1 to 6 carbon atoms, a halogen atom, a nitro group, a cyano group, a
 55 alkoxy group having from 1 to 6 carbon atoms, an alkoxyalkyl group having from 2 to 6 carbon atoms, an alkylcarbonyl group having from 2 to 6 carbon atoms, an alkoxyalkyl group having from 2 to 6 carbon atoms, an aminocarbonyl group substituted independently by hydrogen or alkyl having from 1 to 6 carbon atoms, a haloalkoxy group having from 1 to 6 carbon atoms, an alkylthio group having from 1 to 6 carbon

atoms or an alkylthioalkyl group having from 2 to 6 carbon atoms; Y is a -COOR₁ group (wherein R₁ is a hydrogen atom, an alkyl group having from 1 to 6 carbon atoms, a cycloalkyl group having from 3 to 8 carbon atoms, a cycloalkylalkyl group having from 4 to 8 carbon atoms, an alkynyl group having from 3 to 6 carbon atoms, an alkenyl group having from 2 to 6 carbon atoms, a haloalkyl group having from 1 to 6 carbon atoms, a halocycloalkyl group having from 3 to 8 carbon atoms, a haloalkynyl group having from 3 to 6 carbon atoms, a haloalkenyl group having from 2 to 6 carbon atoms or a phenyl group which may be substituted by alkyl having from 1 to 3 carbon atoms, halogen, nitro or alkoxy having from 1 to 3 carbon atoms), a -COO-L-OR₁ group (wherein L is an alkylene group having from 1 to 6 carbon atoms which may be substituted by alkyl having from 1 to 3 carbon atoms, and R₁ is as defined above), a -COO-L-R₂ group (wherein L is as defined above, and R₂ is a phenyl group which may be substituted by alkyl having from 1 to 3 carbon atoms, halogen, nitro or alkoxy having from 1 to 3 carbon atoms), a -COO-M group (wherein M is a 3 to 6-membered alicyclic residue containing not more than 2 sulfur or oxygen atoms and formed by a linkage of from 1 to 4 carbon atoms), a -COO-L-M group (wherein L and M are as defined above), a -COO-L-O-L-R₂ group (wherein L and R₂ are as defined above), a -COO-L-S(O)_n-R₁ group (wherein L and R₁ are as defined above, and n is an integer of from 0 to 2), a -CON(R₃)(R₄) group (wherein each of R₃ and R₄ is a hydrogen atom, an alkyl group having from 1 to 6 carbon atoms, a cycloalkyl group having from 3 to 8 carbon atoms, a cycloalkylalkyl group having from 4 to 8 carbon atoms, an alkoxy group having from 1 to 6 carbon atoms, an alkynyl group having from 2 to 6 carbon atoms, an alkenyl group having from 2 to 6 carbon atoms, a haloalkyl group having from 1 to 6 carbon atoms, a halocycloalkyl group having from 3 to 8 carbon atoms, a haloalkynyl group having from 2 to 6 carbon atoms, a haloalkenyl group having from 2 to 6 carbon atoms or a phenyl group which may be substituted by alkyl having from 1 to 3 carbon atoms, halogen, nitro or alkoxy having from 1 to 3 carbon atoms), a



group (wherein n is an integer of from 4 to 6), a



35 group (wherein R₅ is an alkyl group having from 1 to 3 carbon atoms), a

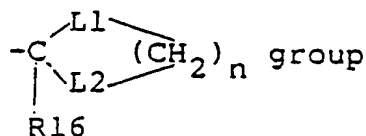


group, a -CONHSO₂CH₃ group, a -CONHSO₂CF₃ group, a -COO-L-N(R₃)(R₄) group (wherein L, R₃ and R₄ are as defined above), a -COO-L-CO-R₁ group (wherein L and R₁ are as defined above), a -COO-L-CO-O-R₁ group (wherein L and R₁ are as defined above), a -COO-L-CN group (wherein L is as defined above), a -COO-L-NO₂ group (wherein L is as defined above), a -COOSi(R₅)₃ group (wherein R₅ is as defined above), a -COO-N=C(R₆)(R₇) group (wherein each of R₆ and R₇ which may be the same or different is an alkyl group having from 1 to 3 carbon atoms), a



group (wherein n is an integer of from 4 to 6), a -COO-L-O-SO₂-R₁ group (wherein L and R₁ are as defined above), a -COO-L-O-CO-R₁ group (wherein L and R₁ are as defined above), a -COO-L-O-L-O-R₁ group (wherein L and R₁ are as defined above), a -COO-L-Si(R₅)₃ group (wherein L and R₅ are as defined above), a -C(O)S-R₁ group (wherein R₁ is as defined above), a -C(S)O-R₁ group (wherein R₁ is as defined above), a -C(S)S-R₁ group (wherein R₁ is as defined above), a -L-O-R₁ group (wherein L and R₁ are as defined above), a -L-O-L-O-R₈ group (wherein L is as defined above, and R₈ is a hydrogen atom or an alkyl group

having from 1 to 6 carbon atoms), a -L-O-M group (wherein L and M are as defined above), a -L-O-L-M group (wherein L and M are as defined above), a -L-NR₈R₉ group (wherein R₈ is as defined above, and R₉ is an alkyl group having from 1 to 6 carbon atoms), a -L-O-CH₂Ph group (wherein L is as defined above), -L-O-L-COOR₉ group (wherein L and R₉ are as defined above), a -L-CN group (wherein L is as defined above), a -L-S(O)_n-R₁ group (wherein L and R₁ are as defined above, and n is an integer of from 0 to 2), a -L-S-L-O-R₉ group (wherein L and R₉ are as defined above), a -L-O-COR₉ group (wherein L and R₉ are as defined above), a -L-O-SO₂R₉ group (wherein L and R₉ are as defined above), a -L-COOR₈ group (wherein L and R₈ are as defined above), a -CH=CHOR₈ group (wherein R₈ is as defined above) or a -L-O-L-CN group (wherein L is as defined above); Z is a halogen atom, a nitro group, an alkoxy group having from 1 to 3 carbon atoms, a trifluoromethyl group, a cyano group or a -S(O)_nR₁₀ group (wherein R₁₀ is an alkyl group having from 1 to 3 carbon atoms or a haloalkyl group having from 1 to 3 carbon atoms, and n is an integer of from 0 to 2); V is a hydrogen atom, a halogen atom, an alkyl group having from 1 to 4 carbon atoms or an alkoxy group having from 1 to 4 carbon atoms; W is a hydrogen atom, a halogen atom, an alkyl group having from 1 to 4 carbon atoms, a haloalkyl group having from 1 to 4 carbon atoms, an alkoxy group having from 1 to 4 carbon atoms, an alkoxyalkyl group having from 2 to 6 carbon atoms, an alkoxy carbonyl group having from 2 to 5 carbon atoms, a haloalkoxy group having from 1 to 3 carbon atoms, a nitro group, a cyano group or a -S(O)_n-R group (wherein n is as defined above and R is an alkyl group having from 1 to 4 carbon atoms); Q is a hydrogen atom, an alkyl group having from 1 to 6 carbon atoms which may be substituted by halogen, an alkenyl group having from 1 to 6 carbon atoms which may be substituted by halogen, an alkynyl group having from 1 to 6 carbon atoms which may be substituted by halogen, a cyanomethyl group, a -C(O)-R₁₁ group (wherein R₁₁ is a phenyl group which may be substituted by the same or different substituents selected from the group consisting of alkyl having from 1 to 6 carbon atoms, alkenyl having from 1 to 6 carbon atoms, alkynyl having from 1 to 6 carbon atoms, haloalkyl having from 1 to 6 carbon atoms, haloalkenyl having from 1 to 6 carbon atoms, haloalkynyl having from 1 to 6 carbon atoms, halogen, nitro and trifluoromethyl, an alkyl group having from 1 to 6 carbon atoms, an alkoxy group having from 1 to 6 carbon atoms or a hydroxyl group), a -S(O)₂R₁₁ group (wherein R₁₁ is as defined above), a -P(O)(OR₁₁)₂ group (wherein R₁₁ is as defined above), a -L-C(O)-R₁₁ group (wherein L and R₁₁ are as defined above), a -L-C(O)-N(R₁₂)(R₁₃) (wherein L is as defined above, each of R₁₂ and R₁₃ is a hydrogen atom or an alkyl group having from 1 to 6 carbon atoms), a -L-R₁₄ group (wherein L is as defined above, R₁₄ is a phenyl group which may be substituted by the same or different substituents selected from the group consisting of halogen, nitro and trifluoromethyl, an alkyl group having from 1 to 6 carbon atoms, an alkoxy group having from 1 to 6 carbon atoms or a hydroxy group), a -L-N(R₁₂)(R₁₃) group (wherein L, R₁₂ and R₁₃ are as defined above), a -L-OR₁₅ group (wherein R₁₅ is a hydrogen atom, an alkyl group having from 1 to 6 carbon atoms or an alkenyl group having from 1 to 6 carbon atoms), a -L-OC(O)R₁₆ group (wherein R₁₆ is an alkyl group having from 1 to 6 carbon atoms or an alkoxy group having from 1 to 6 carbon atoms), a -L-S(O)_nR₁₅ group (wherein R₁₅ is as defined above, and n is an integer of 0 or 2), a -L-SC(O)R₁₂ group (wherein R₁₂ is as defined above),



(wherein each of L₁ and L₂ is a methylene group, an oxygen atom or a sulfur atom, R₁₆ is a hydrogen atom or an alkyl group having from 1 to 3 carbon atoms, and n is an integer of 2 or 3), and a salt thereof.

2. The pyrazole derivative according to Claim 1, wherein A, B, X, Y, Z and Q in the formula I are respectively selected from the following substituents:

A : Me, Et, n-Pr, i-Pr, CH₂CH=CH₂, CH₂C=CH

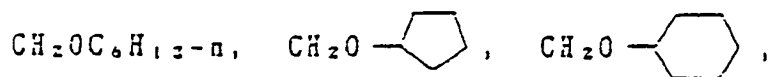
B : H, Me, Et, n-Pr, i-Pr, Cl, Br, CH₂Cl, CF₃, OMe, OEt, OPr-i, SMe, CH₂OMe, CH₂SMe, CO₂Me, CO₂Et

X : Me, Et, n-Pr, i-Pr, n-Bu, i-Bu, s-Bu, t-Bu, OMe, OEt, OPr-n, OPr-i, OBU-n, OBU-i, OBU-s, OBU-t, F, Cl, Br, I, NO₂, CN, CH₂F, CHF₃, CF₃, CH₂CF₃, CH₂Cl, CCl₃, CHClMe, CH₂CH₂Cl, CHClCH₂Cl, CH₂Br, CHBrMe, CH₂CH₂Br, CH₂OMe, CH₂OEt, CH₂OPr-n, CH₂OPr-i, CH₂OBu-n, CH₂OBu-i, CH₂OBu-s, CH₂OBu-t, CHMeOMe, CHMeOEt, CHMeOPr-n, CHMeOPr-i, CHMeOBu-n, CHMeOBu-i, CHMeOBu-s, CHMeOBu-t, CH₂CH₂OMe, CH₂CH₂OEt, CH₂CH₂OPr-i, Ac, COEt, COPr-n, COPr-i, COOMe, COOEt, COOPr-i, CONHMe, CONHEt, CONMe₂, CONEt₂, CONEtMe, OCHF₂, OCF₃, OCH₂CF₃, SMe, SEt, CH₂SMe, CH₂SEt, CHMeSMe,

CHMeSEt

Y : CH₂OH, CH₂OMe, CH₂OEt, CH₂OPr-n, CH₂OPr-i, CH₂OBu-n, CH₂OBu-i, CH₂OBu-s, CH₂OBu-t, CH₂OAm-n, CH₂OAm-i, CH₂OAM-t,

5

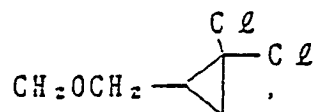


10



CH₂OCH₂CH=CH₂, CH₂OCH₂CMe=CH₂, CH₂OCHMeCH=CH₂, CH₂OCH₂C≡CH, CH₂OCHMeC≡CH, CH₂OCMe₂C≡CH, CH₂OCH₂CH₂F, CH₂OCH₂CH₂CF₃, CH₂OCH₂CH₂Cl, CH₂OCH₂CH₂I, CH₂OCH₂CH₂Br,

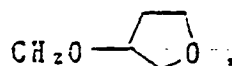
15



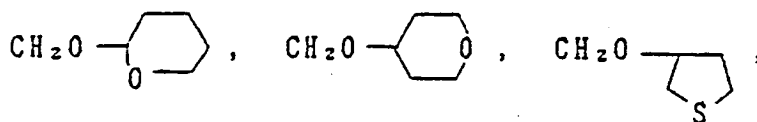
20

CH₂OCH₂CCl=CH₂, CH₂OCH₂CCl=CHCl, CH₂OCH₂CH₂OMe, CH₂OCH₂CH₂OEt, CH₂OCH₂CH₂OPr-i,

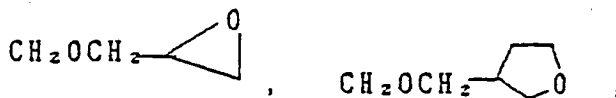
25



30

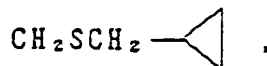


35



CH₂OPh, CH₂OPH-Cl-4, CH₂OPh-NO₂-4, CH₂NHMe, CH₂NHEt, CH₂NMe₂, CH₂NEt₂, CH₂NEtMe, CH₂OCH₂Ph, CH₂OCH₂COOMe, CH₂OCH₂COOEt, CH₂OCHMeCOOMe, CH₂OCH₂COOBu-t, CH₂OCHMeCOOEt, CH₂CN, CH₂SMe, CH₂SEt, CH₂SPr-n, CH₂SPr-i, CH₂SBn-t, CH₂SCH₂CH=CH₂, CH₂SCH₂C≡CH,

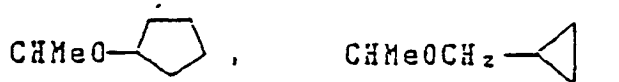
40



45

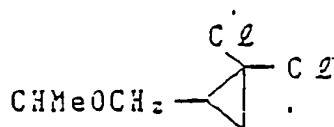
CH₂SCH₂CH₂Cl, CH₂SOMe, CH₂SOEt, CH₂SO₂Me, CH₂SO₂Et, CH₂SO₂Pr-n, CH₂SO₂Pr-i, CH₂SCH₂CH₂OMe, CH₂SCH₂CH₂OEt, CH₂SPh, CH₂OAc, CH₂OCOEt, CH₂OCOPr-i, CH₂OSO₂Me, CH₂OSO₂Et, CH₂OCH₂CH₂CN, CHMeOH, CHMeOMe, CHMeOEt, CHMeOPr-n, CHMeOPr-i, CHMeOBu-n, CHMeOBu-i, CHMeOBu-s, CHMeOBu-t,

50

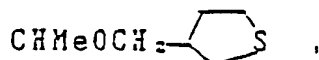
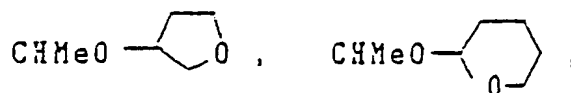


55

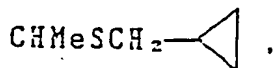
CHMeOCH=CH₂, CHMeOCH₂CH=CH₂, CHMeOCH₂C≡CH, CHMeOCH₂CF₃, CHMeOCH₂CH₂Cl, CHMeOCH₂CCl₃, CHMeOCH₂CH₂Br,



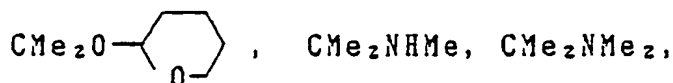
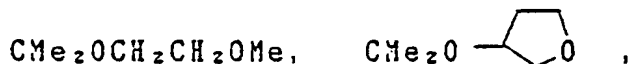
CHMeOCH₂CH₂OMe, CHMeOCH₂CH₂Et,



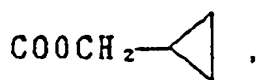
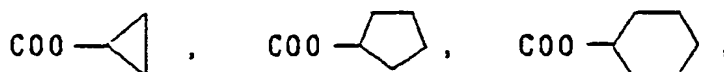
CHMeOPh, CHMeNHMe, CHMeNMe₂, CHMeNEt₂, CHMeOCH₂COOMe, CHMeOCH₂COOEt, CHMeOCH-
MeCOOMe, CHMeCN, CHMeSMe, CHMeSEt, CHMeSPr-n, CHMeSPr-i, CHMeSCH₂CH=CH₂,
20 CHMeSCH₂C≡CH,



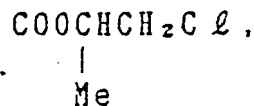
CHMeSCH₂CH₂Cl, CHMeSOMe, CHMeSOEt, CHMeSO₂Me, CHMeSO₂Et, CHMeSO₂Pr-i,
CHMeSCH₂CH₂OMe, CHMeSPh, CHMeOAc, CHMeOCOEt, CHMeOSO₂Me, CHMeOSO₂Et,
CHMeOCH₂CH₂CN, CMe₂OH, CMe₂OMe, CMe₂OEt, CMe₂OPr-n, CMe₂OPr-i, CMe₂OCH=CH₂,
30 CMe₂OCH₂CH=CH₂, CMe₂OCH₂C≡CH, CMe₂OCH₂CH₂Cl,



CMe₂OCH₂COOMe, CMe₂CN, CMe₂SMe, CMe₂SEt, CMe₂SO₂Me, CMe₂SO₂Et, CMe₂OAc, CMe₂OSO₂Me,
CH₂COOMe, CH₂COOEt, CH₂COOPr-i, CHMeCOOMe, CHMeCOOEt, CHMeCOOPr-i, CH₂CH₂COOMe,
CH₂CH₂COOEt, CH₂CH₂COOPr-i, CH=CHOMe, CH=CHOEt, CH=CHOPr-i, COOH, COOMe, COOEt,
COOPr-n, COOPr-i, COOBu-n, COOBu-s, COOBu-i, COOBu-t, COOAm-i,



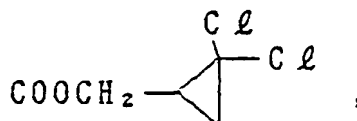
55 COOCH₂CH=CH₂, COOCH₂C≡CH, COOCH₂CMe=CH₂, COOCH₂CH₂Br, COOCH₂CH₂Cl, COOCH₂CH₂F,
COOCH₂CCl₃, COOCH₂CHF₃, COOCH₂CF₃,



5

COOCH₂CCl = CH₂, COOCH₂CCl = CHCl, COOCH₂OMe, COOCH₂CH₂OMe, COOCH₂CH₂OEt, COOCH₂OEt,
 COOCH₂SMe, COOCH₂CH₂SMe, COOCH₂CH₂SEt, COOCH₂CH₂SCH₂CH₂Cl, COOCH₂SOMe,
 COOCH₂CH₂SOMe, COOCH₂CH₂OCH₂CH₂Cl, COOCH₂CH₂OCH₂CH₂Br, COOCH₂CH₂OSO₂Me,
 10 COOCH₂CH₂OSO₂Ph-Me-4, COOCH₂OCH₂CH₂OMe, COOCH₂CH₂SO₂Me, COOCH₂CH₂SO₂Et,
 COOCH₂SO₂Me, COOCH₂CN, COOCH₂CH₂CN, COOCH₂CH₂CH₂CN, COOCH₂CH₂NHMe, COOCH₂CH₂NMe₂,
 COOCH₂NMe₂, COOCH₂CH₂NO₂, COOCH₂CH₂CH₂NO₂, COOCH₂OH,

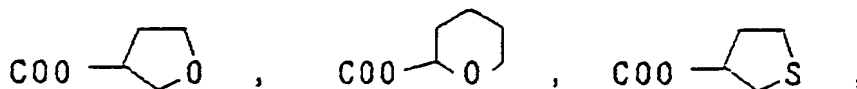
15



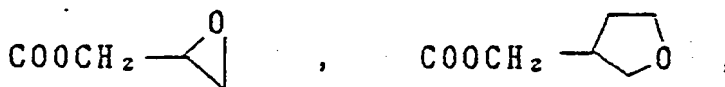
20

COOCH₂COMe, COOCH₂COBu-t, COOCH₂COPr-i, COOCH₂COPh, COOCH₂COOMe, COOCH₂COOEt,
 COOCHMeCOOMe, COOCHMeCOOEt, COOCH₂CH₂OCH₂CH = CH₂, COOCH₂CH₂OCH₂C≡CH,
 COOCH₂CH₂OPh, COOCH₂OPh, COOCH₂CH₂OCH₂Ph, COOCH₂SiMe₃, COOSiMe₃, COOSiEt₃, COOPh,
 COOPh-Cl-4, COOPh-Me-4, COOPh-OMe-4, COOPh-NO₂-4, COOCH₂Ph, COOCH₂Ph-Cl-2, COOCH₂Ph-
 25 Cl-4, COOCHMePh, COOCH₂CH₂Ph,

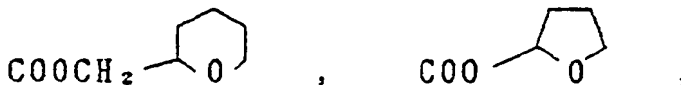
30



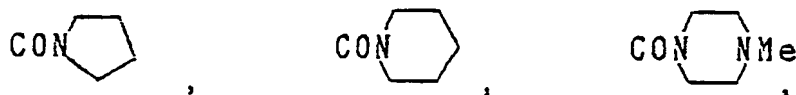
35



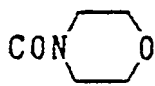
40



50

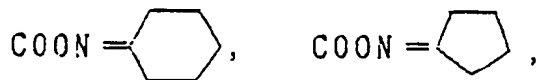


55



CONMeOMe, CONHCH₂CH = CH₂, CON(CH₂CH = CH₂)₂, CONHCH₂C≡CH, CON(CH₂C≡CH)₂, CONMePh,

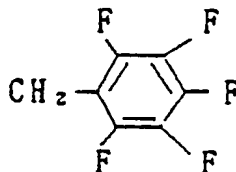
CONEtPh, CON(Me)Ph-Me-4, CONHSO₂Me, CONHSO₂CF₃, COON = CMe₂,



COOCH₂OCOMe, COOCH₂OCOBu-t.

Z : F, Cl, Br, I, NO₂, OMe, OEt, OPr-n, OPr-i, CF₃, CN, SMe, SOMe, SO₂Me, SCF₃, SOCF₃, SO₂CF₃,

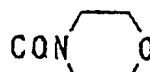
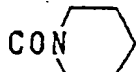
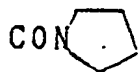
10 Q : H, Me, Et, n-Pr, i-Pr, n-Bu, i-Bu, s-Bu, t-Bu, CH₂CH₂Cl, CH₂CF₃, CHClMe, CH₂CH₂Br, CHClCH₂Cl, CH₂CH=CH₂, CH₂CMe=CH₂, CH₂CH=CHMe, CH₂C≡CH, CH₂CCl=CH₂, CH₂CN, CH₂Ph, CH₂Ph-Cl-2, CH₂Ph-Cl-3, CH₂Ph-Me-2,



20

CH₂Ph-Me-2,4, CH₂Ph-Me-4, CHMePh, CH₂EtPh, CH₂Ph-NO₂-2, CH₂Ph-CF₃-3, CH₂OMe, CH₂OEt, CH₂OH, CHMeOH, CH₂NHMe, CH₂NMe₂, CHMeNMe₂, CH₂COPh, CH₂COPh-NO₂-4, CH₂COPh-Me-4, CH₂COPh-Cl-4, CH₂COPh-Me-2,4, CH₂COPh-CF₃-4, CH₂Ac, CH₂COEt, CHMeAc, CH₂CO₂Me, CH₂CO₂Et, CH₂CO₂Pr-n, CH₂CO₂Pr-i, CH₂CO₂Bu-t, CH₂CO₂H, CHMeCO₂H, CH₂CONHMe, CH₂CONMe₂, CH₂CONHEt, CH₂CONEt₂, CH₂CONPr-n, CH₂OCH₂CH=CH₂, CH₂OAc, CH₂COEt, CH₂COPr-i, CH₂COBu-t, CH₂OCO₂Me, CH₂OCO₂Et, CH₂OCO₂Pr-i, CH₂OCO₂Bu-t, CH₂SMe, CH₂SEt, CH₂SCH₂CH=CH₂, CH₂SAc, CH₂SCOBu-t, CH₂SO₂Me, CH₂SO₂Et, CH₂SO₂CH₂CH=CH₂, CH₂NHCH₂CH=CH₂, CH₂NMeCH₂CH=CH₂, CH₂NHAc, CH₂NHCOEt, CH₂NHCO₂Me, CH₂NHCO₂Et, CH₂NMeCO₂Me, COPh, COPh-Me-4, COPh-NO₂-2, COPh-Cl₂-2,4, Ac, COEt, COPr-n, COPr-i, COBu-n, COBu-t, COCH₂Cl, COCHCl₂, COCCl₃, COCF₃, COCH₂OMe, COCH₂OPh, COCH₂CH=CHCH₃, CO₂Me, CO₂Et, CO₂Bu-t, CO₂Pr-i, CONHMe, CONMe₂, CONHEt, CONEt₂, CONPr-n, CON(CH₂CH=CH₂)₂, CONMePh,

35



40 CO₂CH₂Ph, CO₂Ph, SO₂Me, SO₂Et, SO₂CH₂CH=CH₂, SO₂Ph, SO₂Ph-Me-4, SO₂Ph-Cl-4, SO₂Ph-(NO₂)₂-2,4, SO₂CF₃, P(=O)(OMe)₂, P(=O)(OEt)₂, P(=O)(OPr-n)₂, P(=O)(OPr-i)₂, P(=S)(OMe)₂, P(=S)(OEt)₂, P(=O)-OMeOPh, P(=O)(OCH₂CH=CH₂)₂, P(=O)OPhOCH₂CH=CH₂

3. The pyrazole derivative according to Claim 1, wherein V and W are hydrogen atoms, and A, B, X, Y, Z and Q in the formula I are respectively selected from the following substituents:

45

A : Me, Et, n-Pr, i-Pr, CH₂CH=CH₂, CH₂C≡CH

B : H, Me,

X : Me, Et, i-Pr, OMe, OEt, OPr-i, F, Cl, Br, I, NO₂, CN, OBU-t, CF₃, CH₂OMe, Ac, COOMe, COOEt, COOPr-i, OCHF₂, OCF₃, OCH₂CF₃, SMe, CH₂SMe,

50 Y : CH₂OMe, CH₂OEt, CH₂OPr-n, CH₂OPr-i, CH₂OBu-t, CH₂OAm-n, CH₂OCH=CH₂, CH₂OCH₂CH=CH₂, CH₂OCH₂C≡CH, CH₂OCH₂CF₃, CH₂OCH₂CH₂Cl, CH₂OCH₂CH₂OMe, CH₂NMe₂, CH₂SMe, CH₂SEt, CH₂SOMe, CH₂SOEt, CH₂SO₂Me, CH₂SO₂Et, CH₂OAc, CH₂OSO₂Me, CH₂OCH₂CH₂CN, CH₂OCH₂COOBu-t, CHMeOMe, CHMeOEt, CHMeOAc, CHMeOSO₂Me, CMe₂OMe, CMe₂OEt, CH₂CO₂Me, CH₂CO₂Et, CH=CHOMe, CH=CHOEt, CH₂CH₂COOMe, CH₂CH₂COOEt

55

Z : F, Cl, Br, I, NO₂, OMe, CF₃, CN, SMe, SOMe, SO₂Me, SCF₃, SOCF₃, SO₂CF₃,

Q : H, -CH₂Ph, CH₂COPh, SO₂(4-Me-phenyl), CH₂OC(O)Bu-t, CH₂COMe, CH₂OMe, CH₂CO(4-Me-phenyl), CH₂COOH

4. The pyrazole derivative according to Claim 1, wherein V and W are hydrogen atoms, and A, B, X, Y, Z and Q in the formula I are respectively selected from the following substituents:

A : Me, Et, n-Pr, i-Pr, CH₂CH=CH₂, CH₂C≡CH

B : H, Me,

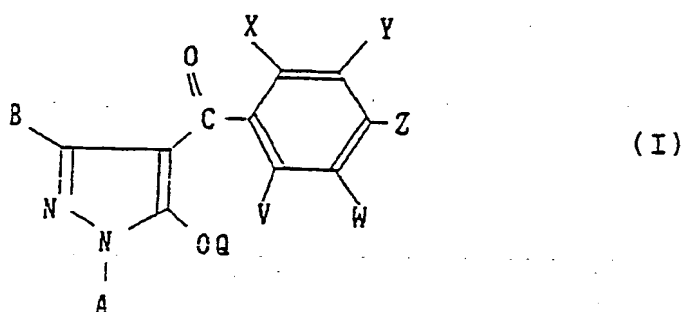
X : Me, Et, i-Pr, OMe, OEt, OPr-i, F, Cl, Br, I, NO₂, CN, OBU-t, CF₃, CH₂OMe, Ac, COOMe, COOEt, COOPr-i, OCHF₂, OCF₃, OCH₂CF₃, SMe, CH₂SMe,

Y : COOMe, COOEt, COOPr-n, COOPr-i, COOBu-t, COOAm-i, COOCH₂CH=CH₂, COOCH₂C≡CH, COOCH₂CH₂Cl, COOCH₂CF₃, COOCH₂CH₂OMe, COOCH₂CH₂CN, COOCH₂COOMe, COOCH₂COOEt, COOCH₂COOPr-i, COOCH₂COOBu-t, CONME₂, COON=CMe₂, CH₂COOMe, CH₂COOEt, CH₂CH₂COOMe, CH₂CH₂COOEt, CH=CHOMe, CH=CHOEt

Z : F, Cl, Br, I, NO₂, OMe, CF₃, CN, SMe, SOMe, SO₂Me, SCF₃, SOCF₃, SO₂CF₃,

Q : H, -CH₂Ph, CH₂COPh, SO₂(4-Me-Phenyl) CH₂OC(O)Bu-t, CH₂COMe, CH₂OMe, CH₂CO(4-Me-Phenyl), CH₂COOH

5. The pyrazole derivative according to Claim 1, which has the formula:



wherein A is an alkyl group having from 1 to 3 carbon atoms; B is a hydrogen atom or a methyl group; X is an alkyl group having from 1 to 3 carbon atoms, an alkoxy group having from 1 to 3 carbon atoms or a halogen atom; Y is an alkoxycarbonyl group having from 1 to 3 carbon atoms, a -CH₂-O-R group (wherein R is an alkyl group having from 1 to 3 carbon atoms) or a -CH(CH₃)-O-R group (wherein R is as defined above); Z is a -S(O)_nCH₃ group (wherein n is an integer of from 0 to 2); V and W are hydrogen atoms; and Q is a hydrogen atom, a benzyl group, a phenacyl group or a tosyl group, and a salt thereof.

6. The pyrazole derivative according to Claim 1, which is

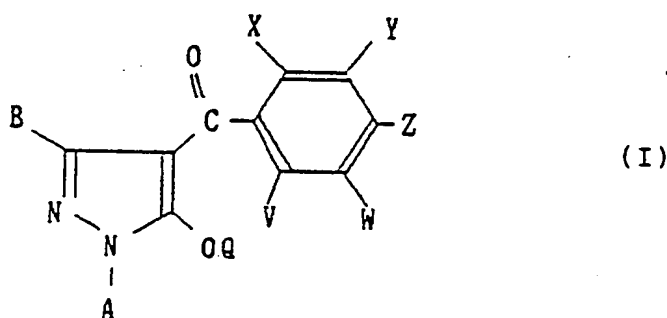
5-hydroxy-4-(4-methanesulfonyl-3-methoxymethyl-2-methylbenzoyl)-1-methylpyrazole,
 1-ethyl-5-hydroxy-4-(4-methanesulfonyl-3-methoxymethyl-2-methylbenzoyl)pyrazole,
 5-hydroxy-1-isopropyl-4-(4-methanesulfonyl-3-methoxymethyl-2-methylbenzoyl)pyrazole,
 5-hydroxy-4-(4-methanesulfonyl-3-methoxycarbonyl-2-methylbenzoyl)-1-methylpyrazole,
 1-ethyl-5-hydroxy-4-(4-methanesulfonyl-3-methoxycarbonyl-2-methylbenzoyl)pyrazole,
 4-(3-ethoxycarbonyl-4-methanesulfonyl-2-methylbenzoyl)-5-hydroxy-1-methylpyrazole,
 4-(3-ethoxycarbonyl-4-methanesulfonyl-2-methylbenzoyl)-1-ethyl-5-hydroxypyrazole,
 5-hydroxy-4-(3-isopropoxycarbonyl-4-methanesulfonyl-2-methylbenzoyl)-1-methylpyrazole,
 1-ethyl-5-hydroxy-4-(3-isopropoxycarbonyl-4-methanesulfonyl-2-methylbenzoyl)pyrazole,
 4-(2,4-dichloro-3-methoxycarbonylbenzoyl)-5-hydroxy-1-methylpyrazole,
 4-(3-ethoxymethyl-4-methanesulfonyl-2-methylbenzoyl)-5-hydroxy-1-methylpyrazole,
 4-(3-ethoxymethyl-4-methanesulfonyl-2-methylbenzoyl)-1-ethyl-5-hydroxypyrazole,
 4-(3-ethoxymethyl-4-methanesulfonyl-2-methylbenzoyl)-5-hydroxy-1-isopropylpyrazole,
 1,3-dimethyl-4-(3-ethoxymethyl-4-methanesulfonyl-2-methylbenzoyl)-5-hydroxypyrazole,
 5-hydroxy-4-[4-methanesulfonyl-3-(1-methoxyethyl)-2-methylbenzoyl]-1-methylpyrazole,
 1-ethyl-5-hydroxy-4-[4-methanesulfonyl-3-(1-methoxyethyl)-2-methylbenzoyl]pyrazole,
 4-(2-chloro-4-methanesulfonyl-3-methoxymethylbenzoyl)-5-hydroxy-1-methylpyrazole,
 4-(2-chloro-4-methanesulfonyl-1-methoxymethylbenzoyl)-1-ethyl-5-hydroxypyrazole,
 4-(2-chloro-4-methanesulfonyl-1-methoxymethylbenzoyl)-5-hydroxy-1-isopropylpyrazole,
 1-ethyl-5-hydroxy-4-(3-isopropoxymethyl-4-methanesulfonyl-2-methylbenzoyl)pyrazole,
 5-hydroxy-4-[4-methanesulfonyl-3-(2-methoxyethyl)oxycarbonyl-2-methylbenzoyl]-1-methylpyrazole,
 1-ethyl-5-hydroxy-4-[4-methanesulfonyl-3-(2-methoxyethyl)oxycarbonyl-2-methylbenzoyl]pyrazole,

- 4-[2-chloro-4-methanesulfonyl-3-(2-methoxyethyl)oxymethylbenzoyl]-5-hydroxy-1-methylpyrazole,
 4-(2-chloro-3-ethylthiomethyl-4-methanesulfonylbenzoyl)-1-ethyl-5-hydroxypyrazole,
 4-(2-chloro-3-ethanesulfinyl-4-methanesulfonylbenzoyl)-1-ethyl-5-hydroxypyrazole,
 4-(2-chloro-3-ethanesulfonyl-4-methanesulfonylbenzoyl)-1-ethyl-5-hydroxypyrazole,
 5 1-ethyl-5-hydroxy-4-(3-n-propoxycarbonyl-4-methanesulfonyl-2-methylbenzoyl)pyrazole,
 4-(2-chloro-4-methanesulfonyl-3-methoxycarbonylbenzoyl)-5-hydroxy-1-methylpyrazole,
 4-(2-chloro-4-methanesulfonyl-3-methoxycarbonylbenzoyl)-1-ethyl-5-hydroxypyrazole,
 4-(2-chloro-4-methanesulfonyl-3-methoxycarbonylbenzoyl)-5-hydroxy-1-isopropylpyrazole,
 4-[2-chloro-4-methanesulfonyl-3-(3-propargyl)oxymethylbenzoyl]-1-ethyl-5-hydroxypyrazole,
 10 5-hydroxy-4-(4-methanesulfonyl-2-methoxy-3-methoxycarbonylbenzoyl)-1-methylpyrazole,
 4-(2-chloro-4-methanesulfonyl-3-isopropoxycarbonylbenzoyl)-5-hydroxy-1-methylpyrazole,
 4-(2-chloro-4-methanesulfonyl-3-isopropoxycarbonylbenzoyl)-1-ethyl-5-hydroxypyrazole,
 4-[2-chloro-4-methanesulfonyl-3-(2,2,2-trifluoroethyl)oxymethylbenzoyl]-5-hydroxy-1-methylpyrazole,
 5-hydroxy-1-isopropyl-4-(4-methanesulfonyl-3-methoxycarbonyl-2-methylbenzoyl)pyrazole,
 15 5-hydroxy-4-(4-methanesulfonyl-2-methoxy-3-methoxymethylbenzoyl)-1-methylpyrazole,
 4-[3-(2-chloroethyl)oxycarbonyl-4-methanesulfonyl-2-methylbenzoyl]-1-ethyl-5-hydroxypyrazole,
 1-ethyl-5-hydroxy-4-(4-methanesulfonyl-2-methoxy-3-methoxycarbonylbenzoyl)pyrazole,
 4-(2,4-dichloro-3-methoxycarbonylbenzoyl)-1-ethyl-5-hydroxypyrazole,
 4-(2,4-dichloro-3-methoxycarbonylbenzoyl)-5-hydroxy-1-isopropylpyrazole,
 20 4-(2-chloro-3-cyanomethyl-4-methanesulfonylbenzoyl)-1-ethyl-5-hydroxypyrazole,
 4-(2-chloro-3-hydroxymethyl-4-methanesulfonylbenzoyl)-1-ethyl-5-hydroxypyrazole,
 4-(2,4-dichloro-3-methoxymethylbenzoyl)-1-ethyl-5-hydroxypyrazole,
 4-(2,4-dichloro-3-methoxymethylbenzoyl)-5-hydroxy-1-methylpyrazole,
 4-[2-chloro-4-methanesulfonyl-3-(2-methoxyvinyl)benzoyl]-1-ethyl-5-hydroxypyrazole,
 25 5-benzyloxy-4-(2,4-dichloro-3-methoxycarbonylbenzoyl)-1-ethylpyrazole,
 5-benzyloxy-4-(2,4-dichloro-3-methoxycarbonylbenzoyl)-1-isopropylpyrazole,
 4-(2-chloro-3-ethoxycarbonyl-4-methanesulfonylbenzoyl)-1-ethyl-5-hydroxypyrazole,
 4-(2-chloro-3-ethoxycarbonyl-4-methanesulfonylbenzoyl)-5-hydroxy-1-isopropylpyrazole or
 4-(2-chloro-3-ethoxycarbonyl-4-methanesulfonylbenzoyl)-5-hydroxy-1-methylpyrazole.

30 7. A selective herbicidal composition comprising a herbicidally effective amount of a pyrazole derivative of the formula I as defined in Claim 1 or its salt and an agricultural carrier or diluent.

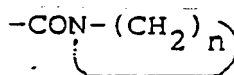
8. A method for controlling weeds, which comprises applying a herbicidally effective amount of a pyrazole derivative of the formula I as defined in Claim 1 or its salt to a locus to be protected.

9. A process for producing a pyrazole derivative having the formula:

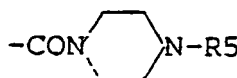


wherein A is an alkyl group having from 1 to 3 carbon atoms, an alkenyl group having from 2 to 4 carbon atoms or an alkynyl group having from 2 to 4 carbon atoms; B is a hydrogen atom, an alkyl group having from 1 to 3 carbon atoms, a halogen atom, a haloalkyl group having from 1 to 3 carbon atoms, an alkoxy group having from 1 to 3 carbon atoms, an alkylthio group having from 1 to 3 carbon atoms, an alkoxyalkyl group having from 2 to 4 carbon atoms, an alkylthioalkyl group having from 2 to 4 carbon atoms or an alkoxyalkyl group having from 2 to 4 carbon atoms; X is an alkyl group having from 1 to 6 carbon atoms, an alkoxy group having from 1 to 6 carbon atoms, a halogen atom, a nitro group, a cyano group, a haloalkyl group having from 1 to 6 carbon atoms, an alkoxyalkyl group having from 2 to 6 carbon atoms, an alkylcarbonyl group having from 2 to 6 carbon atoms, an alkoxyalkyl group having from 2 to 6 carbon atoms, an aminocarbonyl group substituted independently by hydrogen or alkyl having from 1 to 6 carbon

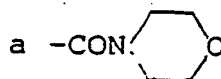
atoms, a haloalkoxy group having from 1 to 6 carbon atoms, an alkylthio group having from 1 to 6 carbon atoms or an alkylthioalkyl group having from 2 to 6 carbon atoms; Y is a -COOR₁ group (wherein R₁ is a hydrogen atom, an alkyl group having from 1 to 6 carbon atoms, a cycloalkyl group having from 3 to 8 carbon atoms, a cycloalkylalkyl group having from 4 to 8 carbon atoms, an alkynyl group having from 3 to 6 carbon atoms, an alkenyl group having from 2 to 6 carbon atoms, a haloalkyl group having from 1 to 6 carbon atoms, a halocycloalkyl group having from 3 to 8 carbon atoms, a haloalkynyl group having from 3 to 6 carbon atoms, a haloalkenyl group having from 2 to 6 carbon atoms or a phenyl group which may be substituted by alkyl having from 1 to 3 carbon atoms, halogen, nitro or alkoxy having from 1 to 3 carbon atoms), a -COO-L-OR₁ group (wherein L is an alkylene group having from 1 to 6 carbon atoms which may be substituted by alkyl having from 1 to 3 carbon atoms, and R₁ is as defined above), a -COO-L-R₂ group (wherein L is as defined above, and R₂ is a phenyl group which may be substituted by alkyl having from 1 to 3 carbon atoms, halogen, nitro or alkoxy having from 1 to 3 carbon atoms), a -COO-M group (wherein M is a 3 to 6-membered alicyclic residue containing not more than 2 sulfur or oxygen atoms and formed by a linkage of from 1 to 4 carbon atoms), a -COO-L-M group (wherein L and M are as defined above), a -COO-L-O-L-R₂ group (wherein L and R₂ are as defined above), a -COO-L-S(O)_n-R₁ group (wherein L and R₁ are as defined above, and n is an integer of from 0 to 2), a -CON(R₃)(R₄) group (wherein each of R₃ and R₄ is a hydrogen atom, an alkyl group having from 1 to 6 carbon atoms, a cycloalkyl group having from 3 to 8 carbon atoms, a cycloalkylalkyl group having from 4 to 8 carbon atoms, an alkoxy group having from 1 to 6 carbon atoms, an alkynyl group having from 2 to 6 carbon atoms, an alkenyl group having from 2 to 6 carbon atoms, a haloalkyl group having from 1 to 6 carbon atoms, a halocycloalkyl group having from 3 to 8 carbon atoms, a haloalkynyl group having from 2 to 6 carbon atoms, a haloalkenyl group having from 2 to 6 carbon atoms or a phenyl group which may be substituted by alkyl having from 1 to 3 carbon atoms, halogen, nitro or alkoxy having from 1 to 3 carbon atoms), a



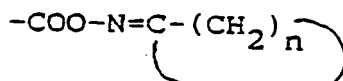
group (wherein n is an integer of from 4 to 6), a



group (wherein R₅ is an alkyl group having from 1 to 3 carbon atoms), a

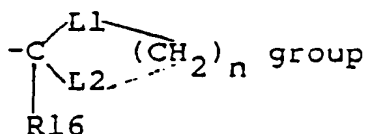


group, a -CONHSO₂CH₃ group, a -CONHSO₂CF₃ group, a -COO-L-N(R₃)(R₄) group (wherein L, R₃ and R₄ are as defined above), a -COO-L-CO-R₁ group (wherein L and R₁ are as defined above), a -COO-L-CO-O-R₁ group (wherein L and R₁ are as defined above), a -COO-L-CN group (wherein L is as defined above), a -COO-L-NO₂ group (wherein L is as defined above), a -COOSi(R₅)₃ group (wherein R₅ is as defined above), a -COO-N=C(R₆)(R₇) group (wherein each of R₆ and R₇ which may be the same or different is an alkyl group having from 1 to 3 carbon atoms), a



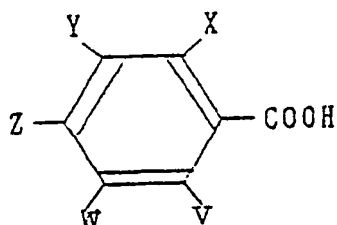
group (wherein n is an integer of from 4 to 6), a -COO-L-O-SO₂-R₁ group (wherein L and R₁ are as defined above), a -COO-L-O-CO-R₁ group (wherein L and R₁ are as defined above), a -COO-L-O-L-O-R₁ group (wherein L and R₁ are as defined above), a -COO-L-Si(R₅)₃ group (wherein L and R₅ are as defined above), a -C(O)S-R₁ group (wherein R₁ is as defined above), a -C(S)O-R₁ group (wherein R₁ is as defined above), a -C(S)S-R₁ group (wherein R₁ is as defined above), a -L-O-R₁ group (wherein L and R₁ are as defined

above), a -L-O-L-O-R8 group (wherein L is as defined above, and R8 is a hydrogen atom or an alkyl group having from 1 to 6 carbon atoms), a -L-O-M group (wherein L and M are as defined above), a -L-O-L-M group (wherein L and M are as defined above), a -L-NR8R9 group (wherein R8 is as defined above, and R9 is an alkyl group having from 1 to 6 carbon atoms), a -L-O-CH₂Ph group (wherein L is as defined above), -L-O-L-COOR9 group (wherein L and R9 are as defined above), a -L-CN group (wherein L is as defined above), a -L-S(O)_n-R1 group (wherein L and R1 are as defined above, and n is an integer of from 0 to 2), a -L-S-L-O-R9 group (wherein L and R9 are as defined above), a -L-O-COR9 group (wherein L and R9 are as defined above), a -L-O-SO₂R9 group (wherein L and R9 are as defined above), a -L-COOR8 group (wherein L and R8 are as defined above), a -CH=CHOR8 group (wherein R8 is as defined above) or a -L-O-L-CN group (wherein L is as defined above); Z is a halogen atom, a nitro group, an alkoxy group having from 1 to 3 carbon atoms, a trifluoromethyl group, a cyano group or a -S(O)_nR10 group (wherein R10 is an alkyl group having from 1 to 3 carbon atoms or a haloalkyl group having from 1 to 3 carbon atoms, and n is an integer of from 0 to 2); V is a hydrogen atom, a halogen atom, an alkyl group having from 1 to 4 carbon atoms or an alkoxy group having from 1 to 4 carbon atoms; W is a hydrogen atom, a halogen atom, an alkyl group having from 1 to 4 carbon atoms, a haloalkyl group having from 1 to 4 carbon atoms, an alkoxy group having from 1 to 4 carbon atoms, an alkoxyalkyl group having from 2 to 6 carbon atoms, an alkoxy carbonyl group having from 2 to 5 carbon atoms, a haloalkoxy group having from 1 to 3 carbon atoms, a nitro group, a cyano group or a -S(O)_n-R group (wherein n is as defined above and R is an alkyl group having from 1 to 4 carbon atoms); Q is a hydrogen atom, an alkyl group having from 1 to 6 carbon atoms which may be substituted by halogen, an alkenyl group having from 1 to 6 carbon atoms which may be substituted by halogen, an alkynyl group having from 1 to 6 carbon atoms which may be substituted by halogen, a cyanomethyl group, a -C(O)-R11 group (wherein R11 is a phenyl group which may be substituted by the same or different substituents selected from the group consisting of alkyl having from 1 to 6 carbon atoms, alkenyl having from 1 to 6 carbon atoms, alkynyl having from 1 to 6 carbon atoms, haloalkyl having from 1 to 6 carbon atoms, haloalkenyl having from 1 to 6 carbon atoms, haloalkynyl having from 1 to 6 carbon atoms, halogen, nitro and trifluoromethyl, an alkyl group having from 1 to 6 carbon atoms, an alkoxy group having from 1 to 6 carbon atoms or a hydroxyl group), a -S(O)₂R11 group (wherein R11 is as defined above), a -P(O)(OR11)₂ group (wherein R11 is as defined above), a -L-C(O)-R11 group (wherein L and R11 are as defined above), a -L-C(O)-N(R12)(R13) (wherein L is as defined above, each of R12 and R13 is a hydrogen atom or an alkyl group having from 1 to 6 carbon atoms), a -L-R14 group (wherein L is as defined above, R14 is a phenyl group which may be substituted by the same or different substituents selected from the group consisting of halogen, nitro and trifluoromethyl, an alkyl group having from 1 to 6 carbon atoms, an alkoxy group having from 1 to 6 carbon atoms or a hydroxy group), a -L-N(R12)(R13) group (wherein L, R12 and R13 are as defined above), a -L-OR15 group (wherein R15 is a hydrogen atom, an alkyl group having from 1 to 6 carbon atoms or an alkenyl group having from 1 to 6 carbon atoms), a -L-OC(O)R16 group (wherein R16 is an alkyl group having from 1 to 6 carbon atoms or an alkoxy group having from 1 to 6 carbon atoms), a -L-S(O)_nR15 group (wherein R15 is as defined above, and n is an integer of 0 or 2), a -L-SC(O)R12 group (wherein R12 is as defined above),



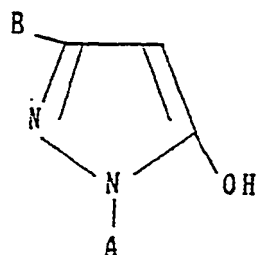
(wherein each of L1 and L2 is a methylene group, an oxygen atom or a sulfur atom, R16 is a hydrogen atom or an alkyl group having from 1 to 3 carbon atoms, and n is an integer of 2 or 3), and a salt thereof, which comprises:

(a) reacting a benzoic acid of the formula:



(II)

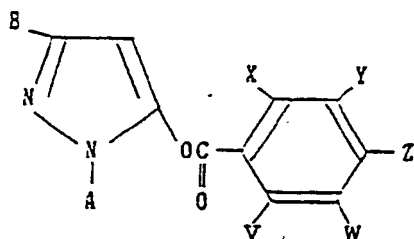
wherein X, Y, Z, V and W are as defined above, with a 5-hydroxypyrazole of the formula:



(III)

wherein A and B are as defined above, to obtain a compound of the formula I wherein Q is a hydrogen atom;

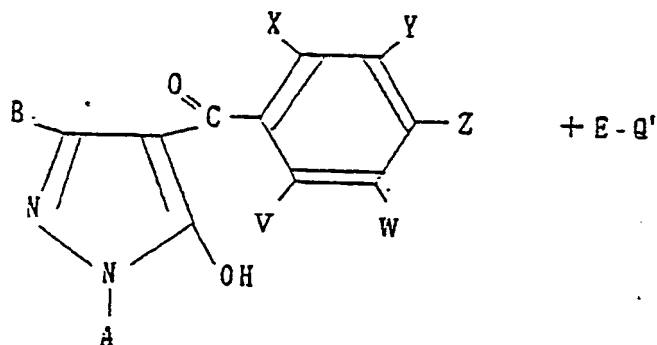
(b) rearranging a compound of the formula:



(IV)

wherein A, B, X, Y, Z, V and W are as defined above, to obtain a compound of the formula I wherein Q is a hydrogen atom;

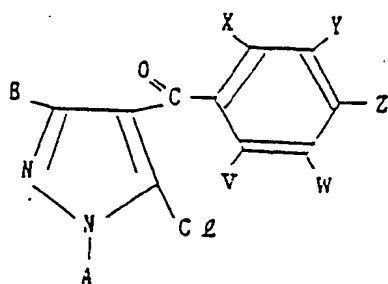
(c) condensing a 4-benzoyl-5-hydroxypyrazole of the formula:



(V)

wherein A, B, X, Y, Z, V and W are as defined above, with a condensing agent of the formula E-Q' wherein E is a halogen atom, a methanesulfonic acid group or a p-toluenesulfonic acid group and Q' is Q as defined above other than a hydrogen atom, to obtain a compound of the formula I wherein Q is as defined above other than a hydrogen atom; or

(d) condensing a 4-benzoyl-5-chloropyrazole of the formula:



(VI)

wherein A, B, X, Y, Z, V and W are as defined above, with a condensing agent of the formula HOQ wherein Q is as defined above, to obtain a compound of the formula I.



Europäisches Patentamt
European Patent Office
Office européen des brevets



Publication number:

0 282 944 A3

12

EUROPEAN PATENT APPLICATION

21 Application number: 88103999.4

22 Date of filing: 14.03.88

51 Int. Cl.⁵: **C07D 231/24, C07D 231/30, C07D 231/32, C07D 231/20, C07D 405/12, C07D 409/12, C07F 9/65, C07F 7/08, A01N 43/56, A01N 57/16, A01N 55/00, //C07C149/40, C07C147/107, C07C63/68, C07C149/247**

30 Priority: 17.03.87 JP 61937/87
17.07.87 JP 179797/87
30.09.87 JP 247601/87
13.01.88 JP 5449/88

43 Date of publication of application:
21.09.88 Bulletin 88/38

84 Designated Contracting States:
AT BE CH DE ES FR GB GR IT LI LU NL SE

88 Date of deferred publication of the search report:
09.10.91 Bulletin 91/41

71 Applicant: **NISSAN CHEMICAL INDUSTRIES LTD.**
7-1, 3-chome Kanda-Nishiki-cho
Chiyoda-ku Tokyo(JP)

72 Inventor: **Baba, Masatoshi**
Copo Yamaichi 203, Hon-machi
Wako-shi Saitama-ken(JP)
Inventor: **Kakuta, Takuya**

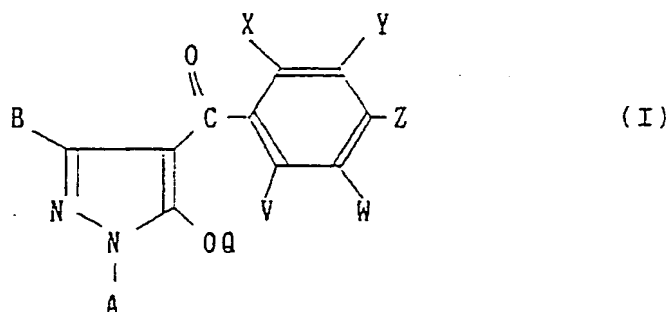
5-17-304, Narashino 1-chome
Funabashi-shi Chiba-ken(JP)
Inventor: **Tanaka, Norio**
788-74, Kowagama
Funabashi-shi Chiba-ken(JP)
Inventor: **Oya, Eiichi**
Nissan Kagaku Kogyo Yatsu-ryo 5-32-9,
Yatsu
Narashino-shi Chiba-ken(JP)
Inventor: **Ikai, Takashi**
19-7, Nishishinjuku 7-chome
Shinjuku-ku Tokyo(JP)
Inventor: **Nawamaki, Tsutomu**
7-3-102, Oto 6-chome
Yono-shi Saitama-ken(JP)
Inventor: **Watanabe, Shigeomi**
14-46-103, Higashiomiya 3-chome
Omiya-shi Saitama-ken(JP)

74 Representative: **Wächtershäuser, Günter, Dr.**
Tal 29
W-8000 München 2(DE)

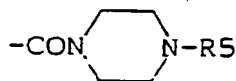
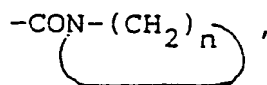
54 **Pyrazole derivative and herbicide containing it.**

57
1. A pyrazole derivative having the formula:

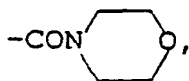
EP 0 282 944 A3



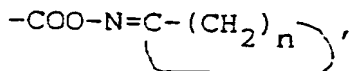
wherein A is alkyl, alkenyl or alkynyl; B is hydrogen, alkyl, halogen, haloalkyl, alkoxy, alkylthio, alkoxyalkyl, alkylthioalkyl or alkoxy carbonyl; X is alkyl, alkoxy, halogen, nitro, cyano, haloalkyl, alkoxyalkyl, alkyl carbonyl, alkoxy carbonyl, aminocarbonyl substituted by hydrogen or alkyl, haloalkoxy, alkylthio or alkylthioalkyl; Y is -COOR1 (wherein R1 is hydrogen, alkyl, etc.), -COO-L-OR1 (wherein L is alkylene which may be substituted), -COO-L-R2 (wherein R2 is phenyl group which may be substituted), -COO-M (wherein M is 3 to 6-membered alicyclic residue containing not more than 2 sulfur or oxygen atoms), -COO-L-M, -COO-L-O-L-R2, -COO-L-S-(O)_n-R1, -CON(R3)(R4) (wherein each of R3 and R4 is hydrogen, alkyl etc.), a



(wherein R5 is alkyl),



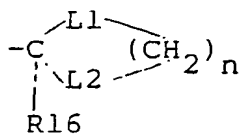
-CONHSO₂CH₃, -CONHSO₂CF₃, -COO-L-N(R3)(R4), -COO-L-CO-R1, -COO-L-CO-O-R1, -COO-L-CN, -COO-L-NO₂, -COOSi(R5)₃, -COO-N=C(R6)(R7) (wherein each of R6 and R7 is alkyl),



-COO-L-O-SO₂-R1, -COO-L-O-CO-R1, -COO-L-O-L-O-R1, -COO-L-Si(R5)₃, -C(O)S-R1, -C(S)O-R1, -C(S)S-R1, -L-O-R1, -L-O-L-O-R8 (wherein R8 is hydrogen or alkyl), -L-O-M, -L-O-L-M, -L-NR8R9 (wherein R9 is alkyl group), -L-O-CH₂Ph, -L-O-L-COOR9, -L-CN, -L-S(O)_n-R1, -L-S-L-O-R9, -L-O-COR9, -L-O-SO₂R9, -L-COOR8, -C=CHOR8 or -L-O-L-CN; Z is halogen, nitro, alkoxy, trifluoromethyl, cyano or -S(O)_nR10 (wherein R10 is alkyl or haloalkyl); V is a hydrogen atom, a halogen atom, an alkyl group having from 1 to 4 carbon atoms or an alkoxy group having from 1 to 4 carbon atoms; W is a hydrogen atom, a halogen atom, an alkyl group having from 1 to 4 carbon atoms, a haloalkyl group having from 1 to 4 carbon atoms, an alkoxy group having from 1 to 4 carbon atoms, an alkoxyalkyl group having from 2 to 6 carbon atoms, an alkoxy carbonyl group having from 2 to 5 carbon atoms, a haloalkoxy group having from 1 to 3 carbon atoms, a nitro group, a cyano group or a -S(O)_n-R group (wherein n is as defined above and R is an alkyl group having from 1 to 4 carbon atoms); Q is hydrogen, alkyl, alkenyl, alkynyl, cyanomethyl, -C(O)-R11 (wherein R11 is phenyl group which

EP 0 282 944 A3

may be substituted, alkyl, alkoxy or hydroxyl), $-S(O)_2R_{11}$, $-P(O)(OR_{11})_2$, $-L-C(O)-R_{11}$, $-L-C(O)-N(R_{12})(R_{13})$ (wherein each of R_{12} and R_{13} is hydrogen or alkyl), $-L-R_{14}$ (wherein R_{14} is phenyl which may be substituted, alkyl, alkoxy or hydroxy), $-L-N(R_{12})(R_{13})$, a $-L-OR_{15}$ (wherein R_{15} is hydrogen, alkyl or alkenyl), $-L-OC(O)R_{16}$ (wherein R_{16} is alkyl or alkoxy), $-L-S(O)_nR_{15}$, $-L-SC(O)R_{12}$,



(wherein each of $L1$ and $L2$ is methylene, oxygen or sulfur and R_{16} is hydrogen or alkyl), and a salt thereof, useful as a herbicide.



European
Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 88 10 3999

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
A	EP-A-0 203 428 (NISSAN CHEMICAL INDUSTRIES LTD.) * claims 1-11 * - - -	1,7-9	C 07 D 231/24 C 07 D 231/30 C 07 D 231/32
A	GB-A-2 122 188 (NISSAN CHEMICAL INDUSTRIES LTD.) * claims * - - -	1,7-9	C 07 D 231/20 C 07 D 405/12 C 07 D 409/12
A	DE-A-2 513 750 (SANKYO CO. LTD.) * pages 20-24; claims * - - -	1,7-9	C 07 F 9/65 C 07 F 7/08 A 01 N 43/56
A	PATENT ABSTRACTS OF JAPAN vol. 6, no. 24 (C-92)(902), 12 February 1982; & JP - A - 56147772 (ISHIHARA SANGYO K.K.) 16.11.1981 - - - - -	1,7-9	A 01 N 57/16 A 01 N 55/00 // C 07 C 149/40 C 07 C 147/107 C 07 C 63/68 C 07 C 149/247
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			C 07 D 231/00 C 07 D 405/00 C 07 D 409/00 C 07 F 9/00 C 07 F 7/00 A 01 N 43/00 A 01 N 57/00 A 01 N 55/00
Place of search		Date of completion of search	Examiner
Berlin		04 April 91	VAN AMSTERDAM L.J.P.
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone			
Y : particularly relevant if combined with another document of the same category			
A : technological background			
O : non-written disclosure			
P : intermediate document			
T : theory or principle underlying the invention			
E : earlier patent document, but published on, or after the filing date			
D : document cited in the application			
L : document cited for other reasons			
& : member of the same patent family, corresponding document			